

INDUCTIVE PSYCHOLOGY



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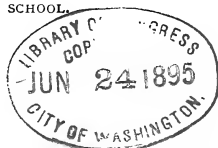
INDUCTIVE PSYCHOLOGY:

AN INTRODUCTION TO THE
STUDY OF MENTAL PHENOMENA,

✓ BY
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NEW YORK AND CHICAGO:
E. L. KELLOGG & CO.

(1895)

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PREFACE.

IN no progressive school are the natural sciences now taught without the use of plants, animals, apparatus and experiments. It is believed that the abstract and deductive study of those subjects fails in giving students the real knowledge and power and interest that may be gained by concrete and inductive study. This little volume is prepared in the belief that the same thing is true in an even greater degree in the study of psychology. The study of abstract psychology and of the thoroughly dried specimens of mental phenomena given for illustration by psychologists leads the pupil to accept on faith classifications, principles, and laws that he can neither observe, verify, nor apply, and not only fails to give him the knowledge and power he should gain from the study, but is often useless and even worse than useless. To gain real knowledge and power, the pupil must observe and analyze the actual processes of his own mind and those of others, instead of taking for granted what the author tells him about imaginary mental processes; and he must be led to observe, judge, and think for himself. With the teacher this is especially important. If he is to make any practical use of psychology whatever

in his profession, he must study the subject in the concrete.

It is now generally recognized that expression is an important factor in making acquisitions clear, precise, and permanent. In no other study is written expression so helpful and even absolutely necessary as in psychology; hence the results of the study of every topic may very profitably be expressed in writing by the pupil.

This little volume does not claim to be a complete or a strictly scientific treatise upon the intellectual powers; but it does aim to develop the real psychological knowledge and power and interest necessary to pursue the subject understandingly either in books or in daily life, and in the school-room. Not what psychologists will say, but what thoughts will be suggested to the pupils, has been given most weight in selecting, arranging, and stating the truths of the science.

The inductive method of presentation is not adhered to strictly, because it does not seem wise to attempt to do so in some instances where it is not easy by printed directions to produce or point out the mental state to be studied. It is, however, inductive in spirit throughout, and every live teacher will by questions and suggestions lead the pupil to go through the mental operations described and observe the facts indicated, in a way that cannot possibly be done by general printed directions. Objects and incidents in the class will continually serve as fresh material to the watchful teacher. Observations and experiences of teachers and students mean more—have more of a living reality—to the students than any

that can be given in a book, and hence are better. It is for this reason, and because of the value of the habit resulting from trying to get such illustrations, that few illustrations are given and many required. Much of what seems vague or incomplete will become clear and definite when these illustrations are discussed.

The favorable reception accorded to the first edition, prepared mainly for my own classes, has led to the issuing of a second edition, which has been enlarged and revised, in accordance with ideas gained in using it in the class-room and suggestions received from others who have used it, especially my colleague, Mr. Galbreath. That the book may aid in more *psychological teaching* of psychology, is the hope of the author.

E. A. K.

WINONA, MINN., Jan. 19, 1895.

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INDUCTIVE PSYCHOLOGY.

CHAPTER I.

INTRODUCTION.

DEFINITION AND SCOPE OF PSYCHOLOGY.

Name five different subjects of study and state what kind of facts each one deals with. Name five different occupations and state what kind of acts are performed and materials dealt with. What is a science? Consult a dictionary and compare the definition with what you know of the use of the word. Name four sciences and state what kind of things each one deals with. Name some of the most exact sciences and state why they are exact.

Just as other sciences are concerned with a certain order of facts, so is psychology. In one respect its scope is broader than that of any other science, for it treats of the mind, by which all subjects are studied, all industries carried on, and all sciences developed.

METHOD.

General Method.—In psychology, as in other sciences, we must observe with a view to classify the countless facts that go to make up the sciences into a comparatively small number of groups, then by further observation, experiment, and inference determine general truths, i.e., those that are true not merely for one thing but for all things—a class. The more general truths discovered and the more it is possible to predict what will take place under given conditions, the more exact the science.

In psychology, however, there is an important source of error. Any number of persons may observe a half-dozen plants or animals that are to be classified, or witness an experiment in chemistry or physics, and each may correct or verify the observations of the others, and thus insure accurate results. Is this true in psychology? Notice your own thoughts and feelings as you read a few lines in this book. Can anybody else observe them? Can you observe directly the thoughts and feelings of any one else? Is it ever possible for more than one person to observe directly the same thought or feeling? This fact may be much more pleasant for us, but is it favorable to the development of an accurate science of mind?

Indirect Observation.—Although we cannot directly observe what is going on in the mind of another, do we not observe the thoughts and feelings of others in an indirect way, by continually inferring from various signs

the thoughts and feelings of our friends? Give some specific examples of how you have inferred the thoughts and feelings of individuals, stating the exact basis of your inference.

You can then observe the results of muscular contraction, in the form of attitude, expression of face, and gesture; and changes in circulation in the form of variations in color; but you cannot directly perceive a thought or feeling. Do you absolutely know that other people have thoughts and feelings any more than has a steam-engine or other complicated machine, or is it an inference based on the fact that you have thoughts and feelings, and express them by such signs? If you had never experienced a feeling of embarrassment, could you infer the feeling from noticing the heightened color, the trembling, and the awkward movements? Can you infer anything in the mind of another that is not like or similar to something experienced by yourself? Analyze very closely all cases in which you seem to be able to do so before accepting them.

Probability of Psychological Inferences.—Notice the variations in certainty in the different examples that follow. Can you understand the thoughts and feelings of a cannibal or an Indian as well as you can those of a man of your own race and state of civilization; of a murderer and thief as well as you can one of your own disposition; of an artist or scientist as well as one of your own ability and culture; of an infant or aged person as well as one of your own age? In all of these cases the bodily form, the nervous system, and all the means of expressing thought and feeling are nearly the same;

but the surroundings, the state of development, and the history are different.

Again, we believe that animals have thoughts and feelings, and we think that we can interpret those of the higher mammals, as the horse, dog, or monkey, and in a less measure those of birds, such as the crow, parrot, or hen. The first have forms, nervous systems, and means of expression different, yet similar, to our own, and the latter a nervous system much the same. In the case of reptiles there is some similarity of nervous structure, but we do not claim to know much about the thoughts and feelings of an alligator, a snake, or a frog. Still less do the form and nervous system of insects resemble our own, and we hesitate to infer anything as to the feelings and thoughts of a fly, a beetle, a butterfly, or a worm. Still less can we affirm about the mental life of an oyster, and we may even doubt that a sponge, a coral, or an amoeba has any consciousness, for they have no brain and no distinct nervous system of any kind.

Again, we ascribe no thought to the rustling leaves and growing grass, or to machines, as we watch the complicated movements of the threshing-machine or the printing-press.

From these examples are we not justified in saying that one basis of our belief that other human beings have thoughts and feelings like our own, which they express in a similar way, is their similarity to ourselves, and that the probability of inferences in regard to the thoughts and feelings of men and animals is propor-

tional to the similarity in nervous structure and in history?

This may seem an unsatisfactory basis for psychological inferences, but is it not the same basis as that used in other sciences? The probability of the inference that other plants will fade or die, if deprived of sunshine or water, after the same period as the ones tested, will be proportional to their similarity to them in kind, age, and condition. Give other illustrations and from other sciences.

So far we have not counted language as a means of gaining knowledge of the mental states of others. Would it be possible to convey to another by means of language a true idea of an experience different from any that person has ever experienced, e.g., the sensation of the color red to a blind man or the note C flat to a deaf man? On the other hand, if men did not have similar thoughts and feelings, would it be possible for a number of them living together to develop a language and communicate with each other?

The Subjective Method of Studying Psychology.—

It is evident that each one can observe his own thoughts and feelings, classify them, and determine the relations existing between them. Since in doing this he makes himself the subject of study, turning his attention within, we call this the *subjective* or *introspective method*. This is the most direct method that there is, but it presents some difficulties. Try to observe just how you feel when you are very angry or very happy; just how your mind works when you are attending closely to a lesson, trying to understand an explanation or working

a problem. Now state the difficulties that you meet with in trying to make your observations accurately. For similar reasons it is difficult to make experiments and observe results. Notice, however, how memory may help in making such observations.

Even if the observations are accurate, and we correctly determine and classify the relations of the various phenomena of our own mind, does it follow that they were the same when we were children, or will be when we get old? Again, are we justified in inferring that the phenomena of other minds and the laws governing them are the same as for our own? Give reasons. Notice what comes into your mind when any word, as "hat," is spoken, and ask others what they think of upon hearing the word. From what has already been said it is evident that what we find true for our own mind is true for other minds only so far as their inherited organization, history, and age are the same. Introspective study of one's own mind, however, forms the basis of all study of psychology. It should be used first, then supplemented by other methods of study.

The Indirectly Subjective Method of Study.—We may study psychological facts in an indirect manner. We may take the recorded results of subjective study by a number of different individuals, compare them, determine what is common to all and what is not. Have a number of persons describe what comes into their minds when several numbers are named—the size of the figures (if visual), their color, distance, position, etc. Pronounce to a group of persons the names of several sound-producing objects and find out in what proportion of

cases visual images are called up, in what proportion auditory, and in what proportion none at all.

Again, ask a number of individuals to recall the appearance of the breakfast-table this morning and say whether the image is distinct as to form, coloring, brightness, etc., and whether the mental images of the voices of companions is as distinct as of their faces. Do you find that what you thought true for all minds is true only for your own and perhaps a few others? May not this method be used to correct the inaccuracies of the purely subjective method?

There is a difficulty in this use of the method, however, due to the fact that the words used may not mean the same. When speaking of external objects we can point them out to another and name them; thus, "this is a chair," "that is a tree," "this movement is walking," etc.; but in describing mental states this cannot be done so readily. Thus, if one says to you, "the pain I feel now is an ache," "this mental act is a conception," "that a sensation," that does not mean much to you? Can you observe what is in his mind so as to know exactly what he means? The classification of mental phenomena in accordance with the language of the different observers may therefore be very inaccurate.

This may be made clear by asking a number of individuals to describe similar experiences, as, for instance, their feelings when lost, or "turned around." It will probably be found that various words will be used to describe the same feeling, and that the same word probably does not always mean the same feeling.

Another form of the indirect method sometimes gives

more reliable results. Instead of taking the observations and opinions of various individuals and tabulating them according to the terms they use, we may ask the persons tested to express their ideas or feelings by descriptions, drawings, or in other ways (perhaps without letting them know the purpose); then we judge for ourselves what ideas or feelings they have, and choose, in tabulating the results, our own descriptive terms. Thus, instead of taking an individual's opinion as to the clearness or vagueness of his mental images, have him describe or draw, and judge from that. So far as an individual's power of expression corresponds to his power of thought, this will give accurate results. It will probably always give more accurate comparative results than classifying according to the judgment and language of the various individuals, for there will be one instead of many standards of judgment. The mental image called by one "distinct" may be less clear than the one called "vague" by another, for each judges by comparison with the mental images *he* is used to having.

Can the writings, paintings, and manufactures of any person or people be used in this way as material for psychological study? Illustrate.

Still more exact results may be obtained by experiments in which there is some objective measure of the mental activity, as, for instance, when the time required to perform a certain mental operation, as pressing a key when a red light is shown, learning a verse of poetry, solving a problem, etc., or the number of repetitions necessary to learn a list of words, or the smallness of difference between two lines, two colors, two sounds, or

two weights that can be detected every time or a certain proportion of times. Such experiments as these, most of which are included in the portions of psychology known as psychometry and psychophysics have given the most reliable results, and offer now the most promising field of investigation.

The fourth form of the indirectly subjective method is the one most used in every-day life. The attitude, expression of face, movements, and tone of voice are the objective basis by which we continually observe indirectly the mental states of others. Illustrate this fact.

Why is this method of study called "indirectly subjective?" Give examples of the use of the various forms of this method in the school-room and the advantages of being able to use them.

The Objective Method.—There is another method which has been of much use to psychology in the past few years, although some have denied that such study is properly a part of psychology. Both men and animals have nerves, a brain, and muscles. Without nerves they would be incapable of receiving sensations of pain, color, sound, or, in short, of being affected in any way by objects. If there were nerves, but no brain to which they might go, feeling and thought would be impossible. Without muscles motion would be impossible, and without motion there could be no expression of thought by language, gestures, or change of countenance. The nervous and the muscular system may be looked upon as a very complex machine. Much time has been spent in studying the structure of the nerves and their end organs—the brain, and the muscles and the nerves con-

necting them with the brain—with the view of determining the function of each and the relation of each to the others. Such a study is a part of physiology and may be carried on without any more thought of the thoughts and feelings that accompany the activity of the various parts of the nervous system than has the botanist in studying the functions of the different parts of a plant, or a mechanic studying the workings of a complex machine. While this is true, and one with a good nervous and muscular system may be able to think and act, or call all the parts into activity, without any knowledge of the structure of the apparatus with which he works or of the parts employed in each activity, yet it is clear, from cases of injured or defective nervous systems, that the perfectness of mental activity is limited by the perfectness of the nervous system, which is the organ of that activity.

The distinctive character of physiological psychology will be more clear if we spend a moment in distinguishing between a psychical and a physical fact. Were the top of the skull of a person removed you could see or touch his brain, but not his mind. If a door were slammed near him he would hear a sound, but you would not see that sensation of sound which he experiences; you would see only a slight change in the circulation of the blood in a certain portion of the brain. A test with a delicate instrument might show also a slight change in temperature, the result probably of chemical change. The phenomena of the brain that you observe are physical facts, the phenomena of mind that he experiences are psychical facts. There is reason for believing that for every physical fact there is a corresponding psychical

fact, and *vice versa*. Physiology is concerned primarily with one set of facts and psychology with the other, and the comparison of the two orders of facts in physiological psychology is a great help to the science of psychology, throwing light on disputed questions, and making conclusions already obtained more definite and precise.

Summarize briefly the three methods of studying psychology, distinguishing between them.

DIVISIONS OF PSYCHOLOGY.

In psychology, as in other sciences, we must look for common characteristics in the great variety of facts to be studied, in order that we may classify them and study one kind of facts at a time. At first thought it seems as if the states of consciousness are so various and changeable that a classification is not possible. A careful analysis of our states of consciousness at any moment, however, will show that they all possess one or more of three distinctly different characteristics. For instance, I feel cold—I know that the fire is going down, and I decide to put in some wood. Again, I hear a sound at the door that I know to be the postman—I feel a desire to know what he brings, and decide to go and see. In these instances we have manifested the knowing, cognitive, or intellectual power of the mind, the capacity of feeling, of experiencing an emotion, and the ability to will to exercise volition. Sometimes one of these is most prominent, and sometimes another, or all may be nearly equal; but every mental phenomenon possesses the characteristic of being an act of feeling, of know-

ing, or of willing. It is therefore convenient to classify mental facts into three divisions, and treat of them under the heads of intellect, feeling, and will. We treat of them separately, not because they are separated from each other in experience, but because it is easier to study one kind of fact at a time. Be prepared to give not less than five examples illustrating each of these powers of the mind.

The distinction between them will become clearer by discussing the following questions: Is there ever cognition without feeling? Can there be feeling without any cognition? Is will necessary to cognition or to feeling? Does it have any effect upon them? Would will be possible without intellect? Would action be possible; if so, would you call it willing? Do we ever will without feeling? If we had no sensibilities could or would we ever will to do anything?

CHAPTER II.

GENERAL INTELLECTUAL POWERS.

CONSCIOUSNESS.

IF one is asleep or has received a severe blow on the head, we say that he is unconscious, which indicates that we know in a general way what is meant by consciousness. One of the distinctions we make between the movements of a man and a machine is that the man is conscious of his actions. This consciousness of our own movements, our thoughts, and the effects produced upon us by surrounding objects, is the necessary condition of intelligence, feeling, and will; and, in fact, it is at every moment one or more of these. We may look upon it as the elementary or, rather, the unspecialized form of intelligence, which may assume a variety of forms, both simple and complex, and be intensified in various degrees. Just stop for a little while and note down all of the things of which you are conscious at the present time. Are you ever conscious of what is going on in your own mind and entirely unconscious of what is going on around you? Are you ever conscious only of the effect outside things are producing upon you? Are you at the present time conscious of all that you know?

Were you once? Can you be so again at will? If you cannot, do you know it?

ATTENTION.

Nature.—When you named the various things of which you were conscious, you found that the senses of sight, of touch, and of hearing were being affected all of the time by various surrounding objects, that your bodily condition was affecting consciousness, and that various thoughts were flitting through your mind. All of these things were occurring simultaneously; but, as you named them, was your consciousness of them equally intense, or were you distinctly conscious of one, then of another, as you named them? When you are observing very closely the chair before you, do you not become almost entirely unconscious of all other things that are affecting your senses? This intensification of consciousness upon fewer, or but one of the many, things that are affecting it, is called attention. Show that it may be to an external object or to a thought in the mind. Attention is quite analogous to the focusing of the eye upon a single object at a time. Indicate as many points of analogy between the two as you can.

Limits.—Looking upon attention as an intensification or concentration of consciousness upon one of the things present to it, it is evident that it may be of all degrees. The minimum degree would be mere consciousness, with the slightest possible intensification upon one object; and the maximum, consciousness of nothing else but the one object of attention—not even of self and surround-

ings. Have you ever been attentive in the maximum degree? Have you ever known any one else who was?

In determining the limits of consciousness as to number of things or mental processes that can be attended to at once, we should use the subjective and the first three forms of the indirectly subjective method. The following experiment will help in making the observations, and also offer an objective test.

Have a friend throw down several similar objects, while you attempt to state the number instantly without counting or grouping them. With how many objects can you do this correctly every time? This indicates in a measure how many external things you can attend to at once.

Now, in order to find how many mental processes you can attend to at once, try the following experiments; repeat a poem and work a simple problem in arithmetic at the same time. Notice whether you attend to both processes at once, or your attention flits from one to the other. As a further means of determining this question, find how long it takes to repeat the poem alone, how long to work the problem alone, then how long to do both at once. In order to make this test fairly it may be necessary to take another problem equally difficult but involving different combinations. For further tests try working a problem mentally while solving another on paper, repeating one poem while writing another, or writing a sentence with one hand, another with the other, while performing an arithmetical operation or repeating a third poem. In any of the above experiments is there a saving of time by doing two or more

things at once? Is there in any of the common tasks?

If two processes can be done in the time required for one, does this prove positively that they are both attended to at once? Must it not mean that, or else that one of them is performed without attention? Which do you think it means? Give your reasons.

What kind of acts can best be done at the same time others are being done—new or habitual acts? Can two acts that are similar or two that are different best be performed at the same time, e.g., repeating a poem and adding, or repeating one poem and writing another?

The explanation seems to be as follows: If two similar processes can fuse into one complex process, as getting thought and pronouncing words, playing, or singing, they can be done together with advantage; but if they cannot, the tendency of the mind to act as a whole—to unify the states of consciousness—causes the two processes to be confused. If the processes are very different the tendency is not so strong but that it may be prevented.

Wherever consciousness is more intense in one direction than in others we truly say that there is attention, but there is reason for believing that consciousness as a whole varies in intensity. When one is half asleep, or even passively interested in what is going on, does not the intensity of consciousness as a whole seem much less than when one is actively and keenly interested in what is being said and done? It is sometimes assumed that the intensity of attention decreases with increase in the number of things affecting consciousness, but this is

probably true only under certain circumstances. An orator addressing an audience or a teacher before a class has many more things affecting consciousness and requiring attention than when considering facts and arguments in the quiet study, yet often they think more clearly and intensely in the former instance. The additional stimuli seem to stir the mind as a whole to greater activity, so that the intensity in several directions is greater than in one when the mind is less active. A friend of mine can write better on the train, amid the noise, than in a quiet room. Give other illustrations, if you can, from your own experience and observations. Try working a problem while some one reads to you, and notice whether the additional stimulus, instead of exciting the mind as a whole to greater activity, diverts it from the task being performed. This is the usual effect also of trying to attend to more than one thing when the two sorts of activity cannot be unified. In these cases increase in the number of things attended to does decrease the intensity of attention. Give other illustrations of this.

Importance of Attention and its Selective Character.

—Since of all the objects that are affecting our senses and of all the thoughts that are passing through our minds, we can attend in a degree above the minimum to but very few, it follows that much of what is potentially within the sphere of our mental life is actually almost non-existent. There are individual differences as to the number of things attended to and the intensity of the attention. Would it be safe to say that the amount of knowledge acquired by any individual is

directly proportional to the degree and extent of his attention? Can you trace any analogy between plants and men as to what they take in of their surroundings? What observations have you made upon pupils showing difference in knowledge corresponding to difference in attention? Which is the more important, that a pupil should be supplied with plenty of books and objects for study and should be given good explanations regardless of what his attention might be, or that he should be kept attentive to whatever is presented, however little it may be? Which is the more important, that the subject should be presented to a class completely and logically, or that the attention of the class should be secured to whatever is presented?

It is not possible, and probably not desirable, to attend to everything affecting us (do you think it would be?), but the question of what kind of things we attend to is a matter of considerable importance. How many of you can tell the number of steps in the stairs or the number of windows in a room of a public building with which you are familiar? This illustrates the truth of the statement made above. Give others.

Now, from your own thoughts and observations, give examples of individual differences as to the things attended to. Suggestion: notice men of different occupations when observing or reading the same thing. Notice differences between yourself and your companions, between men and women, children and adults, as to which sense, eye or ear, is used most and what classes of objects are most noticed. Would it be possible for two individuals surrounded by the same things and thoughts,

brought up in the same way, to acquire a different stock of knowledge and develop a different character because of a difference in attention? Illustrate and give reasons.

Themes for writing: "Importance of Attention;" "Individual Differences as to the Things Attended To."

Kinds of Attention.—As already indicated, attention may be either to external things or to internal thoughts. In either case the attention may be with or without effort. If effort is necessary in order to keep the attention upon the object or idea, we say that the attention is voluntary, but if the object or idea by its intensity or peculiarity excites and holds the attention, then we designate it as non-voluntary or involuntary attention—non-voluntary when no will is used to attend or not to attend, and involuntary when it is difficult or impossible to turn it to other things. Give three examples of each of these three kinds of attention in your own experience. What proportion of your attention to the things around you is non-voluntary? When not studying what proportion of your thoughts are voluntary?

Be ready to indicate what part pleasure and pain, novelty of the thing presented, and natural susceptibility to certain impressions play in non-voluntary attention. Whatever excites attention may be called a stimulus to attention. What is the relation of intensity of stimuli to attention? Of two stimuli differing only in intensity, other things being equal, which will attract the non-voluntary attention, the stronger or the weaker, e.g., a loud or a low sound, a bright or a dim light. Illustrate further.

Voluntary Attention.—Whenever any effort is made

to direct or hold the attention it is to that extent voluntary. Hence voluntary attention may enforce non-voluntary, or it may oppose it, deciding which of two equally attractive objects shall be attended to, or even produce attention to an unattractive object. Give the best example of strong voluntary attention that you can conceive of. Give the best within your own experience; within your own observation. Give your opinion of the value of the power of voluntary attention.

What is the relation between attention and interest? Is voluntary attention ever the result of immediate interest in the thing attended to, or is some derived interest always necessary to voluntary attention (or, in other words, some reason in the way of results why we should attend to the thing in hand)?

How long can you attend continuously to one subject of thought? How long can a child of three, of five, of ten, attend to one thing? Give illustrations, from your observations or reading, of long continued attention to one thing. After you have attended to one thing for a long while do you ever find it difficult to attend to something else? Do people that have the power to attend to one thing for a long while often lack the power to quickly change their attention from one thing to another? Which of these two powers is most valuable, and under what circumstances? Write out your ideal of the kind and power of attention one should possess.

Conditions Favoring and Means of Developing Power of Attention.—Non-voluntary and voluntary attention are very closely related, and the latter must be devel-

oped out of the former. ~ Illustrate the fact that non-voluntary attention frequently leads to voluntary, also that voluntary may change to non-voluntary or even involuntary. Do you continue to exercise your will after you become interested in your lesson? Do you ever find yourself unable to stop thinking about it?

Find how long you can attend to a simple point or line without thinking of anything else, simply by determining to do so. Can pure voluntary attention be maintained for more than a few seconds? Now try the same experiment again, asking yourself questions about it—its size, shape, color, distance from other lines or points, etc. In the latter case there is a frequent change in the mental attitude, and this change excites non-voluntary attention, which makes it possible for voluntary attention to be maintained much longer. How long can you get a child to attend to a piece of chalk by simply telling him to study it? How long by asking him questions about it and having him state what he sees. Would this be a safe statement: "No one can attend to one thing for more than a few moments unless the thing itself changes or he changes his mental attitude toward it—thinks of it in a different way or in relation to other things?"

In order to understand more fully what is involved in attending to a thing, make this experiment: Count all of the "m's" on this page; then count all of the "a's;" then both at once. What mental images, if any, were in your mind in these two cases? If present, is it possible for you to count rapidly or accurately without them? Why is it, if you are hunting for a lost thing,

you want to know how it looks? Is it necessary to have some kind of a mental image of a thing to be observed in order to voluntarily attend to it? Is forming the mental image the necessary and important part of the act of attention?

Is some knowledge of a subject necessary to attention to it? Have you observed children inattentive because of want of knowledge of the thing being presented? Referring back to the question of change in mental attitude as necessary to continued attention, is considerable knowledge necessary to change of mental attitude? Notice what knowledge is required to ask many questions about chalk. Is extensive knowledge a favorable condition for attention?

Illustrate the fact that novelty is favorable to attention. Now what is the relation of novelty of the thing presented to a child and his knowledge of something like it, to the degree of interest and attention it secures from him? Should it be all new, all familiar, or partly new and partly familiar? Give reasons.

How may the attention of a class be secured, and how may power of attention be developed in children? Which is the easier to attend to, words already written, or words the teacher is writing? pictures or maps that are already drawn, or those being drawn? Why? Which will develop attention most, asking a class such questions as, "What are three times four, three times two," etc., or asking them to tell "What three times each of the following numbers is: three, four," etc.? Why? Which is the most favorable to the maintenance of attention, asking a question and then

calling on a pupil, or calling on a pupil and then asking a question? What is the effect of expectancy or a belief that something new or important is about to be presented? How may expectancy be excited?

Can you count ten lines without giving continuous attention till the task is completed? Will the doing of anything, whether play, work, or study, that requires continuous attention in order to do it successfully develop power of attention? Name a number of things that do, and also that do not require continued attention. Where there is little power of attention, as is often the case with young children, it must be excited, i.e., must be non-voluntary mainly, until the pupil has gained more power to control his attention himself. As an application of the truth just learned, illustrate how attention may be excited.

Attention and Movement.—Relax all your muscles, then attend intently to one thing. Can you do it? When you wish to attend intently do you always move or make some muscles tense? Is such muscular contraction a necessary part of the act of attention, so that assuming an attitude of attention is a help in giving attention when it is difficult to do so?

Notice what movements, if any, or feelings of movement, are made when you change your attention from one object to another in the room; when you change from looking at something to listening to a sound; when you change from attending to exterior things to a mental image in the mind, or to your own mental processes. Do you think it possible for attention to change without a change in muscular contraction? Is it possible to

maintain continuous attention while making irregular movements? while making regular motions? Do either ever help any one to maintain attention?

Signs of Attention.—Muscular contractions producing attitude expression of face and movements of head, eyes, or limbs, together with changes in the brightness of the eyes, produce the external signs of attention. Observe these closely in audiences, classes, and individuals under various circumstances, until you are able to read the signs of attention; and state what they are. Give as many as you can now.

CHAPTER III.

SPECIAL INTELLECTUAL POWERS.

IN the preceding chapter we studied about the general intellectual powers, while in this and the two following chapters we shall study the special intellectual powers. The difference is largely one of degree, but consciousness and attention are necessary to all intellectual operations, and are such an important element in those operations that they may by comparison very properly be designated as general.

DIVISIONS.

The three principal divisions of the special powers are illustrated by the following example: I go to a city I have never visited before, pass through its streets, and observe closely all of its buildings. That is, I am cognizant of what is present to my senses. I go home perhaps thinking of other things, but when the name of the city is mentioned there comes up in my mind a mental picture of it just as it appeared when I was looking at it. That is, I am cognizant of a representation of what has previously been presented. Then perhaps I begin to compare the city with others that I

have seen, classify its different buildings, think of their uses, try to determine why it should have so many of one kind, etc. That is, I use my cognitive powers in comparing what is represented with representations of what I have seen at other times and places, i.e., I think. We have illustrated by this example three different powers of the mind (which we shall see later include several others), viz: *presentative*, or the power to know objects actually present; *representative*, or the power to represent objects previously known but not now present; *thinking*, or the power to compare, classify, and reason about things presented and represented. All of these powers may be and in fact usually are exercised together, yet they are, to a considerable extent, different. We *perceive* what is present, we *represent* or form a mental image of what is not present, and we *think* about things perceived and represented. Give examples of the exercise of each of these powers.

THE PRESENTATIVE POWERS.

Sensation.—I hold up this book and you perceive it; but if you had no eyes you would not know of its presence unless I let it fall, and of that you would not be conscious if you were deaf. I place it in your hand and you perceive it, but if, as is sometimes the case, you were unable to feel it, then you could not perceive it in that way. If it had no taste and no odor you could not perceive it unless it should be by the resistance it offered to the movement of your hands. Would it not be to you as if it were non-existent; and is not the same true

of every other object? Could you represent and think about things you had previously seen, heard, felt, etc.? Could you gain new knowledge? You might know something of your own bodily state, whether sick or well, tired or rested, hungry or satisfied, etc., but could you know anything of your surroundings? Your mind might be just as ready for action as ever; but if the sense organs, the eyes, ears, and the little nerve-endings in the skin, mouth, and tongue were destroyed, or the nerves connecting them with the brain were cut, no stimulus from the outside world could reach your brain to call the presentative powers of your mind into action.

Yet a perfect sense organ and a nervous impulse passing to the brain is not all that is necessary to produce a sensation, for if one is unconscious, as when asleep, no sensation is produced by the sound waves falling upon the ear, or by a pressure upon the hand. It is the effect produced upon consciousness by the incoming nervous impulses that constitutes a sensation. The effect is, in fact, more in the nature of a feeling, but the intellect cognizes the existence of the feeling, and by means of the various sensations makes us acquainted with the external world.

The simple sensations given by the special senses are: color and variation in light and shade, by the eye; sounds of different pitch and intensity, by the ear; heat, cold, and contact, by the skin; sweet, sour, bitter, and salt, by the tongue; a variety of odors, by the nose; and movement, by the muscles and joints. It seems at first incredible that by means of these few elementary sensations we can become acquainted with the infinite num-

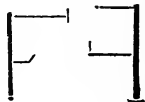
ber of objects and qualities of the external world, yet it is not more strange than that hundreds of thousands of words are made from twenty-six letters, and all material things from about seventy elementary substances. A moment's thought will show you that the picture before which you stand entranced is the result of a change in color and shading of a uniform white surface, and that all the objects in nature known to you by sight are so known only by variations in color and brightness. Find illustrations of a similar truth for the other senses.

Besides these special sensations there are certain general sensations coming from various parts of the body, not always definitely located, which give knowledge of bodily conditions, but tell us nothing of the external world, and so are of little intellectual value.

Discrimination.—If all objects were exactly alike there would be no chance for the intellect to distinguish between things; we could learn nothing. If the intellect had not the power to distinguish between objects that differ, knowledge would be impossible. The power by which I single out one thing for notice and distinguish it from others, as a book, among a number of other things on a table, is discrimination. If it were exactly like the surface of the table and on a level or continuous with it, I could not single it out for notice; or if it were not, but the light were very poor or my vision defective, the same would be true. That is, there must be some discrimination or difference before the object can be singled out for notice, and still further noting of difference before it can be distinguished from other similar objects. The essential element, then, in

discrimination is the power to cognize difference. This implies also the cognition of non-difference or similarity. If this last statement does not seem clear to you, ask yourself when it is you say things are alike. Is it not when you can see no difference?

The singling out for notice is an act of attention brought about by a recognition of a difference. The two processes of singling out for notice or recognition of a difference, and that of noting the character and amount of difference, may be illustrated by doing both for these two figures. The first glance shows that they differ, but a longer time is required to note the nature and amount of the differences. Give illustrations from your own experience of ability to tell that two things differ without ability to tell in what way they differ. Also of ability to see difference after it has been pointed out but not before.



It is often noted with surprise that children see resemblances unnoticed by adults; and it is asserted that they see resemblances more quickly than adults. Have you ever noted the fact that strangers see family resemblance more quickly than members of the family? Have you ever met two brothers or sisters that you could scarcely tell apart at first, but after becoming intimately acquainted with them you could see but little resemblance? All Indians look alike to one who is not used to seeing them, but not to those who have been much with them. Do these facts throw any light upon the apparent readiness with which children note general resemblances? Can you give any farther explanation?

Since the power to recognize difference is such an essential part of all intellectual activity, it has been thought that the smallness of difference that can be detected may serve as a measure of intellectual power. In the branch of psychology known as psycho-physics, a great many experiments have been made upon the discrimination of differences in sensations. Sensations differ in kind or degree. Blue and red differ in kind, light and dark in degree. Give other examples. The experiments have been made mainly with reference to discriminating difference in degree with a view to determining the relation existing between the amount of the difference between the two stimuli or causes of the sensations, and the two sensations that are experienced.

Find how much two lines must differ in length in order that you may detect the difference. It is best to show but one at a time, and record the number of correct and incorrect judgments as to which is longer. Try it with both long and short lines. Find how much the height from which a marble is dropped upon the table must vary in order that you may detect the difference in the intensity of the sound. Find how much two weights must differ in order that you may detect the difference. Try it for both light and heavy weights, as for long and short lines, so as to determine whether the least perceptible difference is a fixed quantity or a ratio. You will thus reach the essential truth of the psycho-physical law. If the least observable difference is twice or thrice as great for lines two or three times as long, then it is a ratio; but if it is the same for all lengths it is a fixed quantity.

Inferring Differences and Resemblances.—Without the power of perceiving differences directly felt, knowledge would be impossible. Without the power of inferring differences not directly felt, knowledge would be possible but very difficult of attainment, for a very large proportion of the differences we note are inferred instead of actually cognized. Looking at two biscuits I say that one is better than the other. I discriminate a difference in their visual appearance and infer a difference in their taste. I look at two cubes and say that one is heavier than the other. I discriminate a difference in size and infer a difference in weight. I see that the mercury in the thermometer is lower and I infer that it is colder. Give a half-dozen other examples of different kinds of inferred differences and resemblances, indicating what is discriminated and what is inferred.

If this were a world of chance such inferences would be impossible, but it is a world of law in which things vary in a fixed and definite way. Hence, if we have received a visual sensation and a tactile sensation from the same object, and another object gives us that same visual sensation, we infer with certainty that it will give us the same tactile sensation as the previous one, and *vice versa*.

Perception.—Defining perception in the simplest manner possible, we say it is the power of recognizing sensations or objects affecting the senses. Try a number of experiments in recognizing objects by the use of but one sense in perceiving, e.g., to recognize wood or metals by touch or by sound. Notice that in every case you receive one kind of sensation, attending to it and

discriminating it from all others, and that you call up mental images of other sensations that have been experienced with that one, and then you recognize those as the characteristics of a certain class of objects. You can make the observation best when you have some difficulty in recognizing the objects, for ordinarily the process is so quick that it is impossible to analyze it.

To recognize an object means that we know its qualities and the class to which it belongs. That is, we are receiving from it one sensation, and from our previous experiences we are able to infer the other sensations that we can get from it by using the other senses. I see a white substance and infer that if I were to put it in my mouth I would experience a sensation of sweetness, and I know that these are the qualities of a kind of substance known as sugar. The moment I come to know this I have recognized or perceived the substance before me.

I receive a sensation of sound that in previous experience was associated with a visual sensation of an object with rough edges moving through wood, and these qualities enable me to recognize or perceive it as the sound of a saw. Learning to know objects—to perceive them—is simply learning what sensations the different classes of objects are capable of giving, and to know when one sensation is given us by an object what others it can give us, and thus to classify or recognize it. The real nature of the process will become clearer if you will consider the following questions: Until you have both seen and tasted an entirely new substance would it be possible to tell from its looks how it would taste, or from

its taste how it would look? Would it be possible to know the song of a bird and to know the bird by sight but not to know its appearance from hearing the song, or to know the song from seeing the bird, providing you had never seen and heard it at the same time? Could a man cured of blindness know from the visual appearance of objects how it would feel until he had had some experience in comparing visual and tactile impressions?

Notice if the following are essential elements of every perception: a sensation, discrimination, more or less definite location in space, mental images of other sensations that have been associated with the one now experienced, and classification of the object more or less definite.

In perceiving *qualities*, as red, sweet, etc., we do not call up images of other kinds of sensations, as in perceiving objects, but of sensations like that now experienced. With adults there is no *pure* sensation, for every sensation calls up mental images of others like it or experienced with it, and so the effect of the stimulus is modified and a perceptive element introduced into every sensation.

Our percepts may be more or less definite, varying with the conditions under which we perceive the perfectness of our sense-organs, and our power of discrimination, the amount of attention we give to the object and our knowledge of such objects. Far ahead in the road I see an object, then as I come closer and note more characteristics I perceive that it is a living thing, then a person,—a boy, a school-boy, coming home from school,—a boy that lives next door to me. My percept

becomes more and more definite as I note new characteristics and classify the thing perceived into smaller classes. Two persons with unequal powers of eyesight, other things being equal, perceive objects with corresponding degrees of definiteness. Again, two men notice a flower by the wayside; one perceives merely that it is a flower, the other that it belongs to a certain family genus and species, and that it is a large specimen just ready to fruit. Give other illustrations of varying degrees of definiteness of perception.

Definite and accurate perception does not depend wholly upon the number of characteristics noted, but upon what ones are noted. The unscientific observer may note a score of characteristics of a plant being examined and the botanist but two or three, and yet the latter perceives much more definitely because he notes essential qualities. Learning to perceive involves learning what are essential characteristics, and forming the habit of attending to them. In science *form* is generally a more essential characteristic than *color*. Notice what characteristics are noted by children and how they recognize things. Did you ever see a child recognize a word by its position instead of its form? Give other illustrations of attention to non-essentials in perceiving.

Illusions.—Defined briefly, illusions are false perceptions. Thus, upon entering a physical laboratory I see before me a bouquet, but upon reaching out to touch it I find nothing there. This is an illusion; for what my visual sensations lead me to infer is not verified to my sense of touch. Inquiry reveals the fact that the place where the bouquet seems to be is the focus of a concave

mirror in front of which there is a bouquet. The rays of light coming from that point produce just the same sensations that they would if they came from a real bouquet at that point, and so in perceiving a bouquet there my sense of sight is not at fault, and my mind acts in the habitual way. The cause of the error is that the conditions under which I perceive are different, so that the influence which under the usual conditions would be verified is not found true. Explain the illusion of a stick appearing crooked in the water; also the illusion of your train seeming to move when it is one on the track beside you that is moving. Cross the fingers and roll a pea or large shot with them. Explain the illusion that results.

Another type of illusion is illustrated by this example. A meadow-lark arises in front of a chicken-hunter; he thinks it a chicken and fires at once. In this case the mental image of a chicken is already present in his mind, so that an object only slightly resembling it is perceived as a chicken.

Such allusions as this usually disappear upon closer observation because the sensation which at first is so much modified by the mental images in the mind that it seems to be a different sensation is soon correctly discriminated. Give other illustrations of illusions of this type.

Sometimes when there is *no* stimulation of the sense-organ objects seem to be seen, heard, or felt. In this case we have what is called an hallucination.

Apperception.—In studying attention we found that what things or characteristics of things any one noticed

depended largely upon his previous knowledge and habits of thought. In studying perception we found that every object had to be classed more or less definitely with a group of similar objects with which the individual is already familiar. In every percept we found two important elements—a sensation coming from without and mental images of sensations and knowledge of classes from within. Apperception concerns especially the latter element. It would not be an exaggeration to say that in reality we attend to and perceive with all that we have previously attended to and perceived. This process of noting the characteristics of any object presented to the senses and bringing it into relation with things already known is called apperception. It is the process of perception carried a little further, so that the object is not only classed with a group of similar objects, but the relation of this thing to various classes of things is noted, so that it is brought into relation with all previous knowledge. An important element in both perception and apperception is a calling up in the mind images of similar things. When a new object is presented we immediately begin to think of what we have seen like it, and what that is depends upon our previous experience. As soon as we have classed it we think also of what we know about that class, and thus more fully apperceive it. Ideas as well as objects are apperceived by being brought into relation with old ideas and understood by means of them.

For examples of apperception recall how different your thoughts of certain places were after you had visited them from what they were before ; the different

ideas the names of certain subjects called up after you studied those subjects. Recall your earlier experiences as to how new things impressed you. Reflect upon the different meaning a flower has to a botanist or a machine to a mechanic from what they have to the uninformed. Notice how children are impressed by new things, how they relate them to something familiar and, to them, similar. Notice in recitation how some pupils are better able to understand because of their apperceptive knowledge. Write an essay upon the educational importance of apperception.

Perception of Space and Time.—So far we have spoken only of perception of things, but a moment's thought shows us that all objects are perceived in space and time. Not only is this true, but we may be said to perceive space and time as well as material things, for we are able to judge of amounts of each, and this power grows with experience. The subject, however, is too difficult for treatment in a brief elementary work.

CHAPTER IV.

THE REPRESENTATIVE POWERS.

Divisions.—The mind not only has power to cognize the objects affecting the senses and its own activities at any time, but also to re-present or represent these experiences, and also to arrange them in different ways. Looking at the exercise of this power from various points of view, we find that it involves the formation of mental images the use of imagination, association, and memory.

The mental images as the result of sensation and perception are retained in memory, recalled by means of association, and variously arranged by the imagination. A little consideration will show that several of these activities are necessary in perception and in apperception. See if you can point out for yourself what ones.

MENTAL IMAGES.

The representative power of the mind is shown in its simplest form in the production of mental images. The representative power is good just in proportion as the mental image approaches in vividness and completeness the original sense perception. If it is fully as distinct

and complete, the two differ only in the fact that in perception the sense-organs were affected by the object while in the forming of the mental image they are not. The nervous process in the brain and the activity of the mind are almost the same. Very rarely, however, is the mental image nearly as distinct as the original impression. How is it in your own case?

Leaving out of account general sensations, how many different kinds of mental images may there be? In your own case which are the most numerous? Which are the most vivid? In trying to answer these questions notice in what way you think of most things,—as they look, as they sound, as they taste, etc.,—and which kind of mental image is the most vivid. Test the vividness of your own visual images and of others by presenting an object, then removing it and having it described or imitated.

There are great individual differences, but in the majority of cases the visual images are both more vivid and more numerous, and the auditory and motor next.

Why should the visual be more numerous? As a help in answering this notice, what senses are affected by the greatest variety of objects; also what ones are affected most continuously.

Can deaf men form auditory images, or the blind visual ones, if they lost hearing or sight late in life? Can they if they were always deaf or blind? Can you form a mental image of an entirely different kind from anything you have ever perceived?

Notice that a mental image may be of a single sensation of a single object, or of a whole landscape; but in

either case it is merely a representation of what has been experienced, without change, except in vividness and in connection with other objects.

Imagination. — This is the typical representative power. The simple mental images of which we have been speaking are the basis of it, and are identical with what is known as *reproductive* imagination. We may look upon the simple mental images as the material out of which the imagination may construct new and more complex mental images.

Picture to yourself a two-story white house 22×26 feet, facing the east, and about 25 feet from the street, which is bordered by elm trees 10 inches in diameter and 8 feet apart. Notice how you construct the mental image, out of material already in the mind, according to directions or descriptions. In doing so you exercise the *constructive* imagination. Any modification of the size, shape, or color of simple mental images is an exercise of the constructive imagination; e.g., imagine a book ten times as large as this, four times as wide and no thicker, and colored blue; or one sixth as large every way, and green.

The representation of any change in the relation of things, as of the furniture in this room, a building turned around or placed on another street, exercises the constructive imagination. Give a description of some building or place you have seen. In doing so you exercise your reproductive imagination. Those who are listening to you form mental images of each of the things as you name them, and exercise their constructive imagination in putting together the simple mental

images so as to form the complex image you describe, and which they have never seen.

The child who can represent the appearance of a word with the last letter changed exercises the visual constructive imagination. The one who can sound together two syllables that he has never sounded together exercises the auditory constructive imagination. The cook who can represent the taste of apples, meat, vinegar, raisins, and sugar combined together in certain proportions exercises the gustatory constructive imagination. Give other illustrations, and illustrations for the other senses. Mediated perceptions, i.e., perceptions of things not present to the senses by means of models, pictures, drawings, designs, or descriptions, exercise the constructive imagination. Illustrate this, and show that we are dependent in such cases upon previous perceptions.

Show the use of constructive imagination in the study of history, reading, and geography.

Draw or write a description of a house or landscape different from any that you have ever seen. In doing this you will use your reproductive imagination in forming mental images of parts of houses or landscapes, and your constructive imagination in combining them together; but you combine them together in your own way, and not according to the directions and descriptions of another. You therefore use a higher form of the imagination, known as the *creative*. This exercise of one's own judgment and taste and ingenuity as to how the elements shall be combined into the complex mental images is what distinguishes creative from constructive

imagination. What kind of imagination does the novelist use? What kind does the reader of the novel use? What kind does a traveller use in his descriptions? What kind do his readers use? What kind does the the composer of music use; the artist who paints an ideal scene; the cook who invents new dishes; the child who makes a new design in drawing or writes an ideal story? Give other examples of the creative imagination.

One's imagination is vivid when he can form vivid mental images. With some children the images are so vivid that they have difficulty in distinguishing them from real perceptions, and so may be unjustly accused of lying. In other cases the power of forming distinct mental images is lacking and needs cultivation. Find illustrations of these statements.

Some have good reproductive imagination but cannot readily imagine anything different from what they have seen, either with or without direction as to how it is to be changed, while others readily make such changes, delight in it, and sometimes are so much inclined to use this power that they are almost unable to give true descriptions of things. Such children delight in fairytales and day-dreams, but the others have more need of such mental exercise.

He who can reproduce vividly and accurately has a good reproductive imagination; he who can construct a thing according to description has a good constructive imagination, and he who can create an object in accordance with the laws of nature or of good taste (as the inventor and poet) has a good creative imagination.

Give illustrations that you have gained, from reading or from observation, of good imagination of each kind.

Association.—Notice as you look at this book that you are conscious, not merely of the book, but to a greater or less extent of the book as in your hand or on the table, as in front of you, in this room, in this building, in this city, and perhaps of other things. Consciousness is a unity, and the object of attention is the central and most vivid portion of that unity. When any portion of that unity of experience is reproduced, is it not true that the rest tends to be reproduced also? Is not the same true of experiences that occur in immediate succession? Illustrate the fact that the sight or thought of one thing tends to produce mental images of other things seen or thought of at the same place or at the same or nearly the same time particularly if the two have been attended to in immediate succession.

This is the general principle of Association. Notice what is suggested to you by certain words, as flag, robin, house, bell, or the sight or thought of certain objects or persons. Every mental image and idea that comes into your mind is probably called up by association with a sensation, a mental image or idea. Verify this by stopping yourself at any moment and noting what you are thinking of and what you thought of just before that.

Perhaps the word "sleigh-ride" makes you think of only one particular sleigh-ride, although you have taken hundreds of them; and the word "gold" of a particular ring, though you have seen hundreds of gold objects. Why were these particular things suggested rather than the others? Ask yourself this question about the vari-

ous things suggested to you in the experiment named above, and see in how many instances you can find it to be due to (*a*) recency of the experience or association, (*b*) intensity, (*d*) number of repetitions. In most all associations you will find that one or more of these three factors determine absolutely what shall be suggested. Sometimes there is more than one thing helping to suggest the idea that comes, as when twelve is suggested to a boy, not by three times four, but by three times one, three times two, three times three, and three times four.

Give other illustrations. May one's general bodily and mental condition have any effect in determining what shall be suggested by experiences or words? Find an answer by noting or recalling the ideas suggested to you by the same thing when you are in different health or in a different mood, or differently engaged.

The general principle of contiguity, that any sensation or idea tends to suggest others experienced at the same or nearly the same time, holds for all associations, but the various ways in which this is done leads to the naming of several different kinds of associations. Pick out and name what seems to you different kinds of associations in the experiment tried above, then compare with the following:

When the thought or sight of a place suggests some experience connected with it, as the thought of a town suggests a friend met there, the association is said to be of place. Give examples of association of place. Where the recurrence of a certain date or the thought of it suggests something experienced at that time, as the above suggests a visit with other friends that imme-

diately followed, the association is said to be one of time. Illustrate this. Which of these two kinds of associations is most prominent in description; in narrative; in history; in geography? A less important kind of association (really one form of time and place association) is where a part suggests the whole, or the whole a part, as wheel, a wagon; house, windows. Illustrate further.

A very important kind of association is that in which an object or idea suggests something that has never been associated with it before, but with something like it. The sight of a strange face may make me think of a distant friend I have not seen for years, because of the general resemblance in feature; or because of one peculiarity of feature, attitude, gesture, or manner of walking. This is known as association by similarity. Illustrate it. This kind of association, with the help of attention, gives great variety to the mental activities, because when the attention is fixed upon one characteristic something having that characteristic is suggested, and when it is fixed on another quality something having that quality is suggested; hence this kind of association does not confine the mind to the repetition of former experiences as occurring in time and space, but presents an infinite variety. You can illustrate this by naming as many things as you can that are like some simple object, say a pencil, in some respect. Association of similarity is *the* important association in scientific classification and reasoning, and it is also important in poetry and other literature.

Where one thing suggests another similar in quality

but different in degree, as high, low; rich, poor, the association is one of contrast. Illustrate this and its use in rhetoric.

If we notice a swelling on a horse's leg we wonder what produced it and what will be the result, even though we have never seen such a swelling produced or the results. This is known as association by cause and effect. Illustrate it. The tendency to associate in this way is perhaps partially natural and partially the result of previous experience in noting successions of events. One who has a strong tendency to this kind of associations usually does a good deal of investigating and reasoning.

There is an association which is only one form of association of time or place, but it is so much used that it is worth special mention. It is that of sign and thing signified. In learning language, either oral or written, this is the kind of association used. Indicate the association that a child must make in learning to understand oral language; in learning to read.

There are great individual differences as to the kind of association most used. Illustrate this from your own observation, if possible. If pupils are required to notice only the time relations in the study of history, will they not get in the habit of forming that kind of associations only? May they be led to form in that study associations of place, cause and effect, and similarity and contrast? Illustrate further how certain habits of association may be formed.

Memory.—We usually think of memory as the power of retaining impressions or experiences of any kind

and reproducing them; but technically this is not the distinguishing characteristic of memory. Is it not equally true that there is no activity of imagination without the reproducing of past experiences?

In imagination do we need to know what impressions were originally associated with the mental image now in mind? Are we not also at perfect liberty to put it with any other mental image we choose? In memory, however, must it not be recognized as having been at some past time associated in our experience with some other fact or experience? If you read a description of a battle, you probably form mental images of men, horses, guns, flags, hills, smoke, etc.; but do you recognize the men, horses, guns, etc., as those seen at any particular time or place? If not, then your mental images of them are not memories. You do not speak of remembering what "dog," "tree," "white," mean as you do of words you have heard or seen but a few times, or new Latin words, because what is frequently experienced becomes free from any definite associations and cannot be located; hence it is not, properly speaking, a memory, for it lacks the distinguishing characteristic of definite location or recognition.

Recognition may be of all degrees of definiteness. Thus there come to my mind the figures \$24.22, and I recognize that I have seen those figures as expressing some fact, but I do not know what. A little more thought and I recognize those figures as the average amount of money possessed per capita by the people of some country, I think the United States. I know I read it about two days ago in my own room in either

the daily paper or the *Review of Reviews*, but do not know the authority, or the article in which it appeared. Give illustrations from your own experiences of varying degrees of recognition.

It is evident from the foregoing that there are three factors in memory, *retention*, *recall*, and *recognition*. The study of memory can be simplified by studying each of these separately.

1. The *retention* of a percept means the retention of one or more of the six different kinds of sense impressions, so we may say that we have six different kinds of memories. Which kind of impressions do you retain best? Recall some experience in which several senses were used, and notice which sensory images are recalled first and most distinctly.

Most ideas are symbolized by a word or group of words which are visual or auditory impressions (or if spoken or written also motor impressions), hence we may inquire as to what kind of words are best retained.

Which do you think you can remember best, what you have heard or what you have read? Recall past experiences. In order to test this further, have ten unconnected letters or figures read to you at the rate of one every two seconds; then have them, or better, another similar list, shown to you at the same rate. Find in which case the most are remembered (regardless of order, for that is a question of association). Repeat the experiment several times. To test the matter further, find how much time or how many repetitions are necessary to learn a verse of poetry by hearing it read, and the same for a similar verse by reading it

silently. Be very careful to have the exercise equally difficult in each case.

In order to find what influence the motor impressions have, perform the above experiments, either repeating or writing the letters, figures, or words.

In performing the above experiments notice whether when you see words you think of the sound, and when you hear them you think of how they look, and whether in the first case you recall them as sounds, and in the second as visual characters. If you do, then you do not use the same sense in storing that you use in acquiring. Some use the visual sense only in storing, translating all sensory experiences into visual terms, and retaining them as visual images; while others use the auditory sense only. Some writers hold that it is best to use one sense only in retention—the one that is most natural for the individual—while others think it best to use all equally. State all of the advantages and disadvantages of both methods that you can think of.

The retention of an experience is accurate and permanent in proportion to the intensity of the experience and the number of times it is repeated. The intensity varies with the feeling accompanying, or interest in the experience and the degree of attention. Give illustrations of the fact that one or a few intense repetitions of an experience will cause it to be retained better than many repetitions with a slight degree of intensity. Is a student gaining in power as a student when he can substitute intensity for many repetitions in acquiring knowledge? Is teaching ability measured in a similar way? How much time could be saved in our schools,

by decrease of repetition, and drill work if presentations were always clear and forcible and pupils attentive?

Is there any reason for believing that retention is affected by the physiological conditions during and after acquisitions, as regards health, fatigue, etc.? Illustrate.

Even when all the conditions for acquisition and retention are the same, it is a well-known fact that the perfectness of retention varies with different individuals very greatly. The difference seems to be a natural physiological difference, and in some cases to be almost as great as that between the sand and a granite rock. Often, but not always, the one who is slow in acquiring retains well. Report any such individual differences that you have observed. There is good reason for doubting whether there is any psychical means of increasing this general power of retention except through increase in the general power of attention, by means of which the impressions are made more intense and the perceptions more accurate and vivid. This would improve the retention of what one tries to learn, but not of impressions received incidentally. As bearing on this question, try to determine whether you retain impressions received incidentally better than you did when a child; whether adults generally do better than children, and educated adults better than uneducated.

2. The recall of any impression depends very largely upon the associations formed between it and other things. The certainty of recall will vary, as we found in the study of association, with the number of things with which it has been associated, the number of times it has been

associated with those things, the recency, and the intensity of the associations. Things are associated together, not so much by being together in consciousness or in immediate succession, as by being attended to together; and the intensity of the association varies with the degree of attention. Illustrate how the ability to recall varies with variations in these factors. State some of the advantages and disadvantages of associating a fact, say in history or geography, with many other facts rather than a greater number of times with only a few other facts. Take into account the value of the fact in the two cases and the habit of mind formed as well as the certainty of retention.

Does association with objects, pictures, diagrams, or vivid descriptions help in remembering facts in natural history, history, geography, and mathematics? Where associations do not make the knowledge gained any more clearer or vivid, or more convenient for use, but are made simply to aid in recalling, we say that the associations are artificial. Such associations are systematically used in mnemonics to "improve the memory."

What would be the effect of the continued and extensive use of such associations upon the thought power of any individual? Would it be compensated by the increased power to remember particular facts, providing there is any such increase?

State how you would group the following things in your mind if you were required to get them: thread, coffee, gloves, steak, three yards of blue ribbon, tea, two yards of point lace, ten pounds of lard, oatmeal, sausage, bleached muslin. The thread should be white; you are

to get two pounds of coffee; the lace must be four inches wide; five pounds of steak and six of oatmeal are wanted; the ribbon is to be $\frac{3}{4}$ in. wide; and of the tea you are to get only $\frac{1}{2}$ lb.; and you must get two pounds of sausage; it is the nine-cent muslin that is wanted, and you are to get ten yards; the thread must be No. 36, and the gloves No. 8. What would be the advantage of grouping them? Can you get from this any general principles as to *how* to group things?

One of the experiments in remembering words, figures, or letters should be repeated, noting how many more repetitions are necessary to remember them *in order*, and how much this is helped by grouping them.

This experiment should also be tried: Have seven figures or letters read to you until you can repeat them all in order; then have fourteen read in the same way until you can repeat them in order (not grouping them), and see whether they must be read more or less than double the number of times that the seven were. What bearing has this upon increasing the length of a lesson or the amount to be learned at one time?

Notice for yourself what kind of association you use most frequently and effectively, and also report any observation made on others in this regard.

Is a thing recalled best by being seen many times and recalled once, or by being seen once and recalled many times? Which student, other things being equal, will recite best—one who reads a lesson through continuously three times, or the one who reads it once and recalls it twice without looking at the book, except occasionally?

What theoretical reason can you give one way or the other? What facts of your own experience?

In voluntary memory attention and will are prominent factors, while in spontaneous recall the laws of association work almost uninfluenced by them. Can you tell just how you voluntarily recall what you wish to recall? You can do this best, perhaps, in recalling a forgotten name. Just how does your will affect the laws of association so as to bring into your mind what you want? Can you do anything more than attend to that in consciousness which is associated with what you want, or can you exercise direct control over what is not in consciousness? Mention instances where the thought and perception of one associate of a forgotten thing will not bring it to mind but of several will.

If you recalled *all* of your mental experiences of the past hour, how long would it take you? Would it be an advantage to remember everything, or is forgetting a condition of a serviceable memory?

Notice how the dropping out of the less intense impressions leads to closer association between the more prominent, so that experiences separated hours or days from each other are thought of as occurring in immediate succession; and also how this recalling intensifies and makes more intense those that are recalled.

Are these individual differences as to classes of things best remembered as well as to kind of impressions and kind of associations. Illustrate. Can this difference often be accounted for by a difference in interest and attention? This will not entirely account for the greater ease with which one learns a certain kind of facts after

he has become used to learning them, even though he tried just as hard to learn others. If you will tell why you can more easily learn about the location of several articles in a familiar room or places in a well-known city than in a strange room or city, you will get a suggestion of the reason. Can you not, in the first instances, from your knowledge of the room or city locate the things named after their relation to one or two things is given, both with reference to all other things in the room and with reference to each other; while in the second instance you must learn all of those relations? When one has a large number of facts closely associated, is not a new fact of the same kind, when learned and associated with one or two of them, in effect, associated with all of them? Again, when one has learned a great many facts of a certain kind, is he not likely to use improved methods of associating facts of that kind which he wishes to learn?

3. *Recognition*, as already indicated, is the distinguishing characteristic of memory, and hence is very important, though much of our most useful and familiar knowledge has not that element, or has it in a very slight degree. Oftentimes one's knowledge enables him to recognize correctly where he otherwise would not be able to do so; as, when one thinks: "My friend told me he walked at the rate of ten miles an hour for four hours." Then: "No, that cannot be; it must have been four miles an hour for ten hours." Give other instances of correction or supplementing of memory by means of knowledge. Does knowledge ever lead to mistakes in memory, as when telling about something which

is usually true, as what we did or said at a certain time?

Give instances of the recall of facts that you are not able to locate either by means of your knowledge of such facts or by recalling the associations in which it was learned. Give also illustrations of instances in which you are not able to recall a name, the features of a person, or the facts in a lesson when you try to do so, but can recognize them as soon as given, seen, or recited by some one else. Which is more frequently lacking with you, the power to recognize or the power to recall? Report any observations you have made upon others in this regard. Is it well to practice exact recognition, as recognizing the source of all facts—the book and author, etc. Is it sufficient sometimes to know where certain facts can be found instead of learning them, i.e., to recognize without recall?

Sum up the important conditions for remembering, state the means of improving memory, and write out your ideal of a good memory.

CHAPTER V.

THINKING.

Nature and Divisions.—Notice what comes into your mind when such words as tree, chair, dog, horse, are seen, and what the words signify to you. The word horse, for instance, signifies (whatever mental image it calls up in your mind), not any particular horse, but a class of animals possessing certain qualities, whatever their color, size, or breed. That is, you have a general notion of what is signified by the word horse and represented, perhaps, by a mental image of its form, and perhaps, also, its size and color. This general notion is called a concept, and the power or process of forming such a general notion is called conception. The meaning a word has to you is in every case your concept for that word. If you think horses are useful you are forming a judgment in regard to them. If you think that because they are useful they must be valuable, you are reasoning. *Thinking* is a general term used to designate these three processes of conceiving, judging, and reasoning. It is specially distinguished from the processes we have been studying by being concerned with classes and qualities instead of particular things and sensations.

CONCEPTION.

Concepts and Percepts.—Perception and conception are similar and mutually dependent processes. Percepts are the material from which concepts are formed; and yet, as we have already found, the process of perceiving is not complete until the thing perceived is referred to a class of similar objects, or, in other words, recognized as an individual included in one of our concepts. Suppose a child who has seen but one horse and has learned to recognize it. Now that horse does not present the same appearance to him every time he sees it, for it is viewed from different positions, at different distances, and perhaps in different attitudes (standing, running, lying down), yet his several percepts of it are sufficiently similar to enable him to recognize it as the same. The mental image of what is common in these percepts, and what distinguish it from any other percepts he may have, enables him to recognize the horse whenever he sees it. Now suppose another horse is brought before him. If it is very like it, he may think it is the same, unless the two are shown at once. If they are different and not too dissimilar he will still notice the similarity, and the same tendency to group and identify similar impressions that led him to identify his various percepts of the one animal will cause him to group the two or more similar animals into a class. He thus forms the concept of the group of animals that we designate by the word horse. This concept changes somewhat as the child sees more and different kinds of horses. His concept is enlarged so as to include more individuals,

and it is made more definite, so that he is not likely to make the mistake which he perhaps made at first of calling a mule, a zebra, or possibly a hornless cow a "horse."

The word now means to him not any particular horse but a class of animals of various sizes and colors, yet having certain general characteristics that distinguish them from any other class of animals. Although the process by which he comes to recognize the horse in various positions and with more than one sense is quite similar to that by which he comes to recognize a class of animals, though the individuals of the class differ in many respects, yet the difference in degree is so great that we say in one case he has a percept and in the other a concept. In the first an object must affect the senses, while in the second it need not. Illustrate this. In the first case it is a particular thing having its own peculiar qualities that is perceived, while in the second it is a class of things having qualities peculiar to the class that is thought. My percept "pen" is the fountain-pen I now hold in my hand, having peculiarities that enable me to distinguish it from all others; my concept "pen," as I think it, is a class of small pointed objects used for making marks, whether wood, steel, quill, or gold. Give other illustrations of the difference between percepts and concepts.

Concepts and Mental Images.—A mental image being a reproduction of a sensation or percept by means of association, without direct sensory stimulation, differs from a concept in much the same way as does a percept, except in the one particular of sensory stimulation. Notice what mental images, if any, are formed when

names of common objects, as box, city, stones, flax, wagon, etc., are seen or heard. Notice whether the mental images have any definite size or color, also whether they are of particular things. Now think a moment as to whether these mental images are all that these words mean to you. It seems as if mental images of some kind are necessary to concepts, just as sensations are necessary to percepts. In the less general concepts, such as tree, house, etc., the mental image is an important element of the concept, while in the more general concepts, such as plant, structure, etc., it is a less important element. With such concepts as organism, substance, etc., mental images are in little or no degree element of the concepts. Yet in order to form and hold such general notions with any degree of definiteness a mental image of some sensory experience is necessary with which the general characteristics of the class can be associated. With man this is usually an auditory or a visual symbol known as a word. Animals can doubtless form concepts in which mental images are prominent elements; but the more general notions are not possible to them or to men without language.

The part that mental images plays in the thinking of different individuals varies greatly, as you will readily see by noticing the definiteness of the mental images called up in the mind of different individuals by common words. Some think almost wholly by means of words, others in mental pictures.

Degrees of Definiteness of Concepts.—In order to form concepts of sufficient definiteness for the practical purpose of distinguishing between the various classes of

objects, it is merely necessary to discriminate that one class differs from another class. It is not necessary that one shall be able to state the points of difference that distinguish one class from others. Test some children only a few years old and see if they are not in some cases able to distinguish one class of objects from another readily and to state points of difference only after thought or not at all. Or in your own case, you perhaps can readily distinguish a German from a native of this country; but can you tell just in what way they differ? Is a child learning to read ever able to distinguish between two words as wholes but unable to tell in what way they differ? In your own case, can you tell the exact difference between the second and the fourth letters of the alphabet and the letter p without looking at them? Give other examples.

Where one can generally distinguish objects of a class from objects of another class, or knows what kind of objects is denoted by a word but is unable to state the qualities that distinguish that class from others, his concept may be said to be in the first stage of definiteness. Where he can name one or more of the distinguishing characteristics we may say that his concept is in the second stage of definiteness. If he can name the characteristics common to all of the objects of the class and not possessed by objects of other classes, or, in other words, state the distinguishing characteristics, his concept is of the third degree of definiteness, or perfect. This is true only when he can give a scientific definition. Would the ability to recognize and state the difference between a white oak and a hickory-tree mean that one

had a perfect concept of a hickory? Would it necessarily follow that he could distinguish a hickory from a pecan tree? Why? Of what degree is your concept tree? Parallelogram? Name three of your concepts of each degree of definiteness.

Extension and Intension of Concepts.—Which includes the most things, figure or parallelogram, oblong or square, animal or vertebrate, mammal or horse? Which of these has the most distinguishing qualities? Notice in giving a definition that besides naming the distinguishing qualities of the class we indicate that it is a member of another larger class; e.g., a parallelogram is a four-sided plane figure whose opposite sides are parallel. That is, we affirm it has all the characteristics of the figure and three more that distinguish it from other figures. In general, what may we say is the relation between the number of things or the *extension* of a general term, and the number of distinguishing qualities or its *intension*? Give illustrations. We also speak of the *extent* of a general term, and the *content* of the term to any individual; and we speak of what things may be *denoted* by a word, and what qualities are *connoted* by it. This is illustrated by the questions, "What people are called teachers;" "What does it mean to be a teacher?"; Give other illustrations. Are proper nouns ever used except to connote?

Modification of Concepts.—In forming concepts something of the same relation between extension and intension may be noted as exists between less and more general classes. For example, a little girl two and one half years old had seen radishes and learned the name

for them. They were red, and when some white ones were placed upon the table she asked what they were. When she understood that they were radishes also, her concept was evidently broadened as to number and variety of things included, but the distinguishing characteristics were for her decreased. Give other examples. Notice that the decrease in the number of characteristics recognized as distinctive means, not that the concept is less perfect, but that it is more definite and precise. Sometimes a distinguishing characteristic is added, and thus the number of things to which the term can be applied is decreased, as when one learns that the word square can be applied only to plane figures. Illustrate further.

All of our concepts that have not reached the third stage of perfectness are subject to change with increased acquisition and experience. Have your concepts been modified by your study of psychology? What ones, and in what way? Without new experience or special study are concepts ever modified by the way in which we hear or see words used? Illustrate. In what proportion of cases has your knowledge of the meaning of words been gained by direct association with experience? By means of a definition or description? By the way in which you have heard the words used in connection with words you already understood? Is there any other way of modifying concepts than these three?

Note this point and illustrate it: To be able to name all the qualities of a class, or, in other words, to give a perfect definition, does not mean that the concept is perfect unless the individual is also able to recognize

those qualities in the objects he sees. In which case will it most likely be perfect—where he has learned the definition, or where he has made it himself? Which is the more valuable—to be able to give the definition of a prime number, or to be able to recognize it instantly? to define a verb, or to recognize one? Is a concept perfect until one is able both to recognize and name the qualities that distinguish it? Which do you think should usually be gained first—the power to recognize, or to define?

Analysis, Abstraction and Abstract Concepts.—I look at the book before me and, disregarding all other qualities, fix my attention upon its color. I look at a flower and notice its color, its shape, the number and position of its stamens, its odor, without thinking of the other qualities when attending to the one. I perhaps compare the color of the flower with that of the book and other objects. Now this singling out for notice one of several qualities or the parts of a whole is analysis, and the thinking of the quality as abstracted from or unconnected with those with which it was perceived is abstraction. Give other examples of analysis. Better take some object before you. Notice in doing so how attention is involved in the process. After having seen a number of red objects I can form a mental image of the quality redness without thinking of any particular red object. This is an abstract concept. Such an abstract concept as this, being representable, could be formed without language, while the more abstract concept color would not easily be formed without a word to serve as a mental image, and such a one as virtue proba-

bly could not be formed with any degree of definiteness without a word with which the quality could be associated. State which of the following are class and which are abstract concepts: building, liquid, swiftness, number, honesty, machine. Name others of each kind.

Can you remember any difficulty you had when a child in forming abstract concepts, e.g., in determining the meaning of the word "large" by the way people used it? Have you observed any such difficulty in the case of children? In pupils in school, e.g., difficulty in forming a sufficiently distinct concept of divisor, dividend, and quotient to clearly understand principles in which those terms are used abstractly? Give other examples from your experience and observations in the school-room.

The distinction between class and abstract concepts is that the one is of things, the other of qualities. A very general class concept is abstract, however, in the sense that it is not concrete—is far removed from sense perception. To be able to think of dogs or trees without thinking of any particular dog or tree in any particular place involves abstraction just as much as thinking of white without thinking of any particular white thing.

In forming abstract concepts, analysis and abstraction are necessary from the first; but in the early stages of forming class concepts they are not. Could one form class concepts of the second stage of definiteness without performing acts of analysis and abstraction? Why?

Classification.—The formation of concepts is grouping together a class of similar objects, or the formation of a class, while perception is the placing of an object

Notice that in doing so you must analyze sufficiently to note similarities that serve as the basis of classification, and that you must overlook many differences and note certain similarities very carefully. Which is the more difficult—to take a heterogeneous lot of things and decide upon a basis for classifying them, or to put objects in a class the characteristics of which have already been determined? Why? Which do you do in parsing; in classifying plants? Which was done by those forming the sciences of grammar and botany?

Since objects possess many qualities, it is evident that after one has formed numerous class and abstract concepts, he can classify an object in various ways, according as one quality or another is taken as the basis of classification. I can classify my pen as an instrument, as a metal, as a pointed thing, as a small thing, etc. Classify a piece of paper in as many different ways as you can; a piece of meat. In these cases you are putting objects in classes already formed, and, in general, your practical needs, decide how you shall classify things; thus, wood is a thing that will burn, that will float, that will bear a weight, according as I need warmth, a means of crossing a river or a support for some heavy object. Illustrate further.

Generalization.—I look at a number of script letters and make the general statement that right curves are used in all of them. I find in multiplying a^2 by a^3 that the exponents are added, and make the general statement that in all multiplication of similar quantities the exponents are added. To make these statements I must generalize. The power, then, to detect similarity com-

mon to a group of objects or to form a new class with the characteristics observed in one or a few individuals is generalization. Give examples.

A moment's thought will show that in order to form concepts or classes we must generalize. For instance, when I see that all the lines given above have the quality of direction—some horizontal, some vertical, and others slanting, I am generalizing. Varied experience with objects leads one gradually to a knowledge of common characteristics, but we do not usually speak of the process as generalization unless it is performed intentionally upon examining a number of objects.

When a class is formed from an examination of but one or a few specimens, by picking out the essential characteristics of those objects and making them a basis of classification, the process is slightly different. Give examples of where that is done in this book, also other illustrations. Recall, for instance, how many examples of a certain kind in arithmetic are required before children can discover the essential characteristics and arrive at the general principle, or the number of verbs that must be given before they get the general idea of the class verbs. Notice also how many particular illustrations are necessary before *you* get the general notion of what generalization is. This last form of generalization, as will be seen later, is practically the same as induction.

JUDGMENT.

I say that lead is heavy or is a metal, or that this object in my hand is lead. In the first case I assert

that a certain quality is characteristic of lead, in the second that the class of things known as lead belongs to the class of things known as metal, and in the third case that this particular object belongs to the class of things called lead. Give examples parallel to the above, noting what is being compared in each case—objects, classes, or qualities. Every one of these statements expresses a judgment in the form of a proposition. All perceiving and all thinking involve judgments, either positive or negative; and if the judgment is explicitly stated it must be in the form of a proposition having a subject and a predicate. In ordinary perceiving and thinking the judgment it made so quickly that we do not realize that there is any such act of the mind, but whenever there is doubt as to the nature of the object perceived, the relation between two classes of objects, or as to the qualities of any class, the act of judging is distinctly present. Give examples.

Basis and Accuracy of Judgments.—I look at two lines and say that one is longer than the other. The basis is the percepts of the two lines, and the accuracy depends (1) upon my general power of discriminating differences, (2) upon my special power of visual discrimination, (3) upon the amount of practice I have had in judging the extension of lines of that length in that position. If I say this line is longer than the one I made yesterday, the basis is my percept of one line and my mental image of the other. If I say the line I drew the day before yesterday was longer than the one I drew yesterday, the basis is my mental images of the two

lines. In these cases, upon what does the accuracy depend? Give other examples.

Give examples in which a particular object, present or not present, is said to belong to a class, samples of which are and are not present, stating the basis of the judgment and upon what its accuracy depends, e.g., this is an oak-leaf: object, present; basis, percept of the leaf and concept of an oak-leaf; accuracy, dependent upon correctness of percept and concept, and ability to correctly compare the two. Do the same where one class is judged to be included in another class.

What is the basis and what determines the accuracy of judging of qualities, as: this cloth is a bright red; this leaf is parallel-veined; this child perceives well; these children are attentive? Does it follow that because a person has good judgment in regard to some things that he has in regard to all? Illustrate and give reasons.

Make some general statement as to the relation of number and definiteness of concepts of a certain kind to judgments of certain facts.

The relation of feeling to judgments should also be noted. Do feelings influence the individual judgments of those who observe articles at a fair; listen to a declamation contest; or the report of a trial? Give other illustrations and make a generalization.

REASONING.

Nature and Kinds.—"That is a good apple for it is red and mellow." "Corn will be high-priced because it

is scarce." In these propositions one thing is asserted to be true, not because the truth is directly cognized, but because something else is known to be true. In all such cases reasoning is involved to some extent. Analyzing these propositions, we find that they each imply three distinct judgments, viz.:

This is a red and mellow apple;

All red and mellow apples are good;

Therefore this apple is good;

Corn is scarce this year;

Whenever corn is scarce the price is high;

Therefore the price will be high this year.

We are constantly making such inferences as these, and in every case such inferred judgments may be analyzed into three judgments, one of which is the expression of a general truth.

Make the analysis in several instances, pointing out the general truth. Oftentimes in making such inferences we are not conscious that we are inferring, as when we say to a child, "That stove will burn you if you touch it." Yet we are asserting what we do not immediately perceive. By experience we have come to a knowledge of a certain general truth (viz., that a hot stove will burn) that we expect will be verified in this particular instance. *If the general truth is consciously recognized in making such inference we are reasoning.*

In the examples given above, a general truth is already known, and it is applied in a particular case so as to give us knowledge that we cannot directly cognize about that particular thing. This is known as *deductive* reasoning, the truth of the last proposition being

deduced from the general truth and what is known of the particular thing in regard to which the inference is made. Point this out in several examples.

There is another kind of reasoning which is illustrated by this statement of a boy: "I have found out this year that melons are ripe when the curl is dead." Analyzed, this statement would be: All melons that I have observed with the curl dead were ripe. What is true of those I have observed is true of all melons. Therefore all melons with a dead curl are ripe. In such cases as this, where truths are observed in regard to particular things, which things are thought to be typical of this class in this respect, so that the same truth may be affirmed of all objects of the class, we have an example of what is known as *induction* or inductive reasoning. In this kind of reasoning the general truth, instead of being the basis of the inference, is the conclusion or what is inferred. Give examples of inductions and analyze them into three propositions.

Sources of General Truths.—In adult life most of our reasoning is deductive, and hence dependent upon the large number of general truths that we know—principles, maxims, laws, etc. A very large proportion of these general truths has been gained by induction; not many of them, perhaps, by a distinct act of inductive reasoning, but gradually gained by experience. Thus a boy in the period between eighteen months and two years frequently placed toys in a box turned upside down, and it was only gradually that he came to know the general truth that all unsupported bodies fall. Give other illustrations of general truths acquired grad-

ually by experience, and also of some you have gained quickly by a distinct act of inductive reasoning. State also some general truths that you have accepted upon the authority of some one else. Can you think of any other source of general truths? If not, how many sources of general truths are there for those that have become known to mankind in general? How many for each individual.

There are certain natural tendencies of the mind to act in certain ways so strong that they have sometimes been designated as innate or intuitive truths, but there is no reason to believe that they exist as truths previous to experience. Of these there is one, irresistible and universal, which lies at the basis of all inference and reasoning. It is that what is true of one thing is true of others like it under like conditions. This is the basis of the deduction that what is true of a class of objects is true of an object like those objects, i.e., of the same class; and of the induction that what is true of a particular object is true of other objects like it, i.e., of the same class. Mistakes in reasoning are made, not in applying this truth, but in deciding that an object is a member of the class or that an object is typical of a class.

Reasoning and Inference.—Animals and young children may infer from one particular to another without analyzing to find the basis of inference and the general truth involved, but this is not reasoning in the *stricter* sense of the word. The father of a two-year-old girl blew upon one of two little dolls he had just given her, making a noise. She at once held up the other for him

to blow upon, evidently inferring that if blown upon the same effect would be produced. This was a mere inference based upon experience. In reasoning the complex whole is consciously analyzed, and what one has found true of objects possessing certain characteristics is said to be true of all objects possessing those characteristics, and that truth is affirmed of any object found to possess such characteristics.

In the above example, analysis of the complex thing, the doll, would show it to be provided with an opening of such a form that when blown upon it always produced a sound, and the induction could be made that all dolls having such an opening would sound when blown upon. When the second doll is examined, if the same kind of an opening is found the deduction could be made that this doll, if blown upon, will sound. (In the above instance there was no such opening in the second doll.) Give other examples of inferences by children and animals.

I could infer from experience that upon a cold morning a piece of iron will feel colder than a piece of wood of the same temperature, or I could reach the same conclusion by reasoning in this way: "Of cold bodies, good conductors of heat feel the colder; iron is a better conductor of heat than wood, therefore it will feel the colder."

If the water in a glass pitcher freezes solid, what will be the result? Give a reasoned answer.

When a cat has learned to open a screen door by putting its paw on the latch, has it performed an act of reasoning? What would be necessary to make it an act of reasoning?

Give other examples of inferences, and show when they are reasoned, and when they are mere inferences based on experience. Note that there are all gradations, from a simple inferred judgment to the most exact reasoning, the difference being largely an increased consciousness of the general truth and intentional analysis to find the exact element to which it applies.

Relation of Analysis and Synthesis to Reasoning.—Primarily analysis means separating into parts, and synthesis putting together. Give examples of mental processes of these two kinds. Since in induction the particular things and conditions must be analyzed in order to determine what ones are the basis of the universal affirmation, that kind of reasoning has been called analytic. In deductive reasoning two things are put together, and what is known to be true of one is affirmed of the other; hence that kind of reasoning is often called synthetic. In reality, however, the words analytic and synthetic should not be applied to reasoning at all. Analysis is necessary in induction, but its function is ended when a thing is separated into its parts; and the inference that what is true of the thing possessing these characteristics will be true of all things possessing those characteristics, is an induction, and, properly speaking, analysis has nothing to do with the reasoning phase of the process. Analysis plays almost as essential a part in deductive reasoning as in inductive, for the object must be analyzed to determine whether it possesses the characteristics of the class; hence calling inductive reasoning analytic reasoning tends only to produce confusion, with no corresponding advantage. Besides, analy-

sis and synthesis are involved in all mental operations, and is only a little more active and conscious in reasoning, and in one kind not much more than in the other. Compare analysis and synthesis with association and disassociation, pointing out the parallelisms.

To illustrate the inductive method of reasoning and of presenting a subject, let us solve this problem. Find a method of determining the square of the sum of two quantities. Take the example $(a + b)^2$: $(a + b)^2 = (a + b) \times (a + b) = a^2 + 2ab + b^2$. I analyze the answer and find that I have in it the square of a , the square of b , and two times the product of a and b , and that they all have the plus sign. I know this to be the true result for these two quantities, and I might find it true for a number of others, and so conclude that it would be true for all quantities. I could not be sure of it, however, without some better basis for my conclusion than the fact that it is true in a number of cases. I therefore examine the problem more closely. I see that the first two terms must be multiplied together, and that the result will be the square, since they are the same, no matter what the numbers or quantities in the problem are. I perceive the same for the second term. I perceive also that the first term must be multiplied by the second and the second by the first, and hence that I must have, no matter what quantities are used, the square of the first term, the square of the second, the product of the first by the second, and the second by the first. I see also that since the sign of both terms is plus, all the quantities of the product will have plus signs. Thus, by analyzing the problem and applying

the definitions of the terms sum, square, etc. and certain general principles already learned about them, I am able to decide with absolute certainty that what has been found true of these two quantities will be true for any and all quantities. We might have said at the beginning, let a and b represent *any* two quantities, but we cannot do this unless we can *see* that in all essential characteristics they are like all other quantities, so that they may represent them.

In *deduction* we must analyze the statement and apply it to the particular problem. Thus in the example $[(x^3 + y^n) + (4a^n - b^2 + c^4)]^2$ I have two quantities, and they are connected by the plus sign, so I have the sum of two quantities, and this is the kind of problem to which the theorem applies. Now the theorem says that I will have the square of the first, that would be $(x^3 + y^n)^2$; the square of the second, that would be $(4a^n - b^2 + c^4)^2$; twice the product of the first by the second: the product would be $(x^3 + y^n)(4a^n - b^2 + c^4)$, and twice that would be $2(x^3 + y^n)(4a^n - b^2 + c^4)$; and the signs are all plus, so my answer must be $(x^3 + y^n)^2 + (4a^n - b^2 + c^4)^2 + 2(x^3 + y^n)(4a^n - b^2 + c^4)$.

The rigidly inductive method is shown in the above to involve almost as much knowledge of definition and general principles as the deductive, and the deductive to require almost as close analysis as the inductive; and so the two kinds of reasoning are very similar and closely related in all inferences.

In teaching, when particulars are given the pupil and he is led from an examination of one or more of these to the general truth, the method is said to be in-

ductive, while if the general truth is given first and then applied to particulars, the method is called deductive. Illustrate both methods in the teaching of topics in several common-school subjects.

Kinds of Induction.—Inductive reasoning in mathematics is more closely related to deduction and the conclusions more certain than in the natural sciences, for the concepts in mathematics are not gained directly from observation (e.g., square, right angle, circle), but are made by putting together in the definition certain simple characteristics that are already known, while in the natural sciences the essential characteristics of any class of things are determined by observation and experiment, and may be changed at any time by examination of other specimens. For example, the views of scientists as to what constitutes the essential characteristics of plants and animals have been changed several times. It is comparatively easy to know whether a truth in regard to a particular example is true for the whole class of figures or problems in mathematics, for you can know whether the characteristics upon which the truth depends are the characteristics of the class (though pupils in geometry do sometimes make the mistake of trying to prove for all triangles what is true only of equilateral or right-angled triangles). In natural science, however, one cannot readily determine whether what is true of one plant, animal, or piece of wood or stone is true of all of the same class. If it is found true for many and lacking in none, the probability increases. The real basis of assurance in all such cases is a belief in the uniformity of nature, so that the same elements

and forces will always under the same conditions produce the same results. If we are sure of the elements, forces, and the conditions, we have no doubt as to the conclusions. Number of instances, however great, can never give that assurance unless they cover all possible variations of conditions. A very few instances, under varying conditions, may warrant more positive inductions than a large number under one condition.

The certainty is also very much increased if the fact can be connected with some law of more general application. Thus the induction that a certain kind of soil will always produce wheat better than another kind is made very much more certain by finding that it contains a substance (phosphorus) needed in the wheat that is not found in the other soil. The certainty that winds or ocean currents will continue to move as they have in years past depends not so much upon the number of years they have been observed to move in that direction, as upon the determination of the laws governing their movement.

Where there are many conditions and it is impossible to note the effect of the presence or absence of that element in individual cases, it is necessary to use statistics to discover how much the general results differ with variations in certain elements; as, determining the effect of city life upon physical development, or the effect of education upon memory.

Where two classes of objects are similar in a few or many respects the induction is often made that they are similar in other respects. Thus a nervous impulse and an electric current are similar in many respects, and at one

time they were thought to be identical, but the discovery of the great difference in their rate of transmission caused that idea to be abandoned. Now since light and electricity have been proven to travel at nearly the same rate, and to obey the same laws of reflection and refraction, it is believed that they are alike in other respects, and perhaps identical in their essential nature. This is reasoning by analogy, and is not a very accurate mode of reasoning, except when the things are very similar and the characteristics essential ones. Thus, though there are many points of similarity between a current of water and a "current" of electricity, a physicist would hesitate to affirm that what is true of one will be true of the other. The reasoning of unscientific people, however, is very frequently in the nature of analogy, certain characteristics being observed and others inferred to be present because they were in some other individual of the class, or are in some other class; e.g., "this man is from the same state, and has the same-shaped nose as the man who swindled me last year, so he also is a swindler."

Conditions Favoring Success and Accuracy in Reasoning.—In our general discussion we found that analysis is one of the important things distinguishing reasoning from mere inferences, and we have just now found that it is necessary to success in both inductive and deductive reasoning. A great number and variety of examples are favorable to the perception of the characteristics and conditions upon which an induction is based, but often a single case thoroughly analyzed gives a more reliable induction than a hundred uncritical observations. In mathematics a single case is generally

all that is needed, while in natural sciences there must be enough to determine the truth under all possible conditions and to allow for errors of observation.

We see also that a knowledge of the characteristics of the things being considered (a clear concept of them, the power to define them scientifically) and a knowledge of the general truths about them are necessary in reasoning. We may say, then, that the more clear concepts one has and the more general truths with which he is familiar, the greater his power to reason, other things being equal; and his power to reason on any particular subject will depend upon the number and definiteness of his concepts of all things included in and connected with it. Do you know of individuals who are good reasoners upon some subjects and not upon others? If so, does this help to explain such instances? Can the supposed inability of children to reason correctly be accounted for in a similar way? Explain.

Will all conditions favoring accuracy of judgment favor accurate reasoning? Why?

Add to the above the power of attention to follow closely a line of thought, and we have the main qualities required in following a chain of reasoning given by another.

To reason independently with success requires all these and more. One must be able to analyze and have the sagacity to seize upon the right characteristic—to conceive of the thing in the right way. We found that things may be classed in a variety of ways according to the characteristic made the basis of the classification. In the instance of reasoning about wood and iron, they

might have been classed in various ways, but only when they were conceived of and classed as conductors of heat could there be any successful reasoning upon the question to be solved. When this was done any one who was familiar with the general truth that iron is a better conductor than wood could readily reach the conclusion. Give other illustrations.

Another power, and one upon which the preceding is partially dependent, is necessary. If, when one thing is presented we had no tendency to think of other things like it, independent reasoning would be impossible, however much knowledge one might have. A tendency to association by similarity is, then, one of the most important conditions of successful independent reasoning. Can you give any observation illustrating this point?

A tendency to associate by similarity, though a necessary condition of reasoning, does not insure accuracy. When the similar thing is called up there must be ability to discern whether the similarity is an essential characteristic about which some general truth is known, otherwise analogies may be taken for proofs. Again, one who associates by similarity may note similarities and overlook differences equally important. He is especially apt to omit negative cases, e.g., he observes that it storms when the moon changes, but fails to note the cases when it does not. In order to make an accurate induction he must record all cases, both positive and negative. Many false opinions upon various subjects are formed because of failure to do this. Scientific men, when they have a theory to prove, often continu-

ally find evidence of its truth and none of its falsity. Why?

A tendency to associate by similarity, however, is not even a characteristic peculiar to the reasoning type of mind. It is equally characteristic of the poet. With the poet, however, it is usually a subtle analogy of things as wholes, while with the reasoner it is a similarity in the elements discovered by analysis. Verify this by examining a form and an argument or demonstration.

CHAPTER VI.

HABIT.

NOTICE in regard to anything that you have done frequently, and see if you cannot do it more easily, and with less thought, also, if you do not do it in the same way every time. Observe the same in regard to others, their peculiarities in sitting, standing, walking, gesturing, performing duties that they have frequently performed. Report specific examples of what you have observed in this line. Are you not able sometimes to recognize a friend by some such little peculiarity? Have you also noticed that some persons always observe certain things rather than others, always think of certain things under certain circumstances (as a story, when a certain subject is mentioned), and always express themselves in a characteristic way? If you could observe as well would you not find the mental characteristics of an individual just as marked as the physical movements?—his thoughts just as characteristic as his penmanship? Is it not true that each one has his own peculiar habits of perceiving, imagining, associating, remembering, conceiving, judging, reasoning, feeling, and willing? Illustrate from observations upon persons or upon the style of

different authors. In this chapter we are to inquire into some of the principal causes of these peculiarities.

Nature of Habit.—You have already noted the fact that an act often repeated is more easily performed. Suppose that this were not the case, would any education whatever be possible, or would one always remain in the infant stage both as to movement and intelligence? As it is, however, every movement and every thought, every physical and mental activity, leaves an effect in the way of an increased power and an increased tendency to perform that act. In the muscles there is also an increase in size, and in the brain, which is the organ of mental activities, the same is perhaps true, to a less extent. In both thinking and movement, nervous impulses pass from one part of the brain to another, and along the spinal cord and a nerve to the muscles. Whenever a movement is made a certain portion of the brain is active, an impulse passes along a certain course to certain muscles, which are contracted. The result is, that when the same conditions recur there is a tendency for the same parts of the brain to become active and for the impulse to take the same course. Point out the analogy between this and the flowing of water; also give other analogies. In the case of the nervous and muscular system, the activity uses up energy which comes from the tearing down of the complex chemical compounds in the brain and muscles. The increased power to perform the act comes from the building up that takes place afterwards in excess of what has been torn down. The increased tendency comes from this fact, and probably also from the fact that the resistance to the

passage of the nervous impulse along that "path" is less. The increase of power through exercise depends upon the first; and the more exercise the greater the increase in power, providing the building up is in excess of the tearing down. This will be the case when enough and not too much exercise is taken at one time and a sufficient interval of rest follows. Illustrate, then, the importance of each individual determining for himself the amount and the kind of exercise most favorable for him to develop in the highest degree his physical and mental powers.

Habit depends partly upon the development of the nerve cells and muscles concerned in the activity and partly upon the decrease in resistance to the passage of a nervous impulse along a certain path, so that when the impulse is originated again under the same conditions it takes the same course. The question arises, How many times must an act be performed before it becomes a habit? Is it a habit after one performance? Is it a habit when the tendency to do that act under those conditions is greater than the tendency to do any other? or is it not until the act is performed unconsciously? In one sense the habit is begun with the first performance, and when the tendency to do that act has become stronger than the tendency to do any other act it may very properly be called a habit; yet common usage would probably restrict the term to acts that can be performed with little or no direction by consciousness.

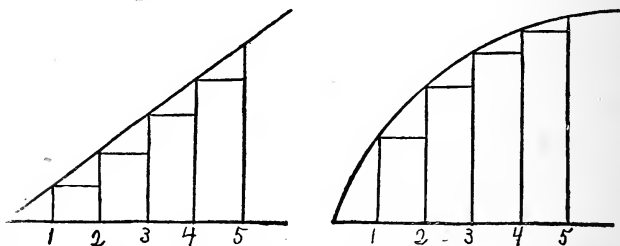
Laws Governing the Formation of Habits.—What statement can you make in regard to the number of repetitions of an act upon the resulting power and tendency

to perform it? Analyze your statement very carefully to see just what it means and to make it accurate. State and illustrate the law in regard to the effect of increased intensity upon the tendency. By intensity is meant emotional accompaniment of the act or degree of attention to it.

Is the tendency developed most strongly and made most permanent by regular or by irregular repetitions of the act? Illustrate and give reasons why it should be so. Indicate some of the practical applications of the truth you state to exercise study.

What effect does recent performance of an act have upon the tendency to perform it? Illustrate.

Other things being equal, does the first performance of an act produce greater or less effect than any subsequent performance? Illustrate. Does the third produce more or less effect than the thirtieth? Which of the following diagrams would best express the truth in regard to the increase of tendency to perform acts with additional repetitions?



Is it easier to form a new habit or change an old one; e.g., to learn a new word or to change the pronunciation of one already learned? Give other illustrations.

How many times, other things being equal, must a word be pronounced correctly after being spoken incorrectly ten times before the tendency to pronounce it one way is equal to that to pronounce it the other way? How many more times before the tendency becomes as great to pronounce rightly as it was to pronounce wrongly? What is the practical application of this to ourselves and in teaching? Can you give any example where you seem to have changed a habit with but few repetitions? Have you ever, in such instances, long after the change, performed the former act upon occasion, e.g., take a certain route or go to a certain part of a room for an article? Consciousness and will are important factors in changing habits, adding to the intensity of the new act; but if they are occupied with something else the old habit will manifest its existence even after a long disappearance. What practical suggestion, then, do you get in regard to first impressions and forming of habits? Have you ever spent more time in correcting a mistaken notion than in learning a new one? How much time is wasted in our schools in correcting wrong ideas and ways of doing things?

Effects of Habit.—As was indicated in the introductory discussion, the result of habit is a decrease in the consciousness accompanying the performance of an act and greater rapidity and ease in doing it. Give specific examples illustrating each one of these points. In regard to the last two points, decide and give your evidence as to whether saving of time generally or universally means saving of energy, and *vice versa*.

We now inquire as to the source of the saving of time.

Does an act or task require a shorter time with repetitions merely because the nervous impulse moves more rapidly as the resistance decreases, so that the movement or mental act takes place more quickly? In answering, notice whether in doing a new manual task you ever waste time more than in an habitual one by stopping between motions or by making movements that do not contribute to the doing of the task. Which of these is the most important factor in the saving of time in habitual acts, particularly with persons who became expert and rapid workers? In purely mental tasks is there a similar saving of time through a better direction of attention? Illustrate. For an experimental illustration turn to a new page and, giving a value of one to consonants and of two to vowels, add the first twenty letters and multiply the sum by the sum of the first two. Repeat the experiment five times, having some one time you accurately each time. Also try it five times, taking a new page each time. Indicate as nearly as you can the principal reasons why you can do it quicker the fifth time.

Analyze in a similar way to discover why energy is saved in performing a task after it has become habitual. Of the various factors, is decrease in the voluntary attention necessary to perform the task a minor or an important factor?

Does habit usually increase the power and tendency to do similar as well as the same kind of acts and tasks? Illustrate. Use the second part of the above experiment as one illustration; also try the experiment giving other values to the letters. Theoretically, in so far as the same

parts of the muscular and nervous system are used, increased powers would have been developed, and this would of itself probably produce some tendency to activity. The course of nervous impulses would, however, probably be somewhat different in the similar acts from what they are in the same. This effect of a habit upon other processes than the ones performed may be spoken of as a tendency of a special habit to become general. Illustrate this tendency and discuss the wider effects of forming habits of punctuality, order, neatness, and accuracy in school. Also of the extent to which forming habits of attention, observation, and reasoning in one line helps in others. What is the comparative value of the habits gained in school to the knowledge gained there?

Intellectual Development and Habit.—If you work a new problem in mathematics you develop your mathematical power. Now suppose you continue working the same problem over and over, will you continue to get intellectual development? If you work problems similar to this you will get intellectual development, but after you have worked hundreds or thousands of problems involving that principle, will you continue to develop mathematical ability by working such problems? Illustrate from industrial business and professional life the effect of confining one's self to a regular round year after year.

New experiences or the finding of new relations are necessary to intellectual development, the one involving the activity of new parts, the other new paths for nervous impulses. Habit can give neither of these, but can only preserve what has been gained, make it a

permanent part of one's self, and prevent the loss of time and energy in the various activities. The question then arises: Should any acts be made so habitual as to be almost automatic; and why? If so, what ones? In general, is it those that are to be performed rarely or those that must be performed frequently? Name specifically some physical and mental processes that should be made almost automatic, particularly some that are used in the school, and in different subjects in the school. How much time would be saved if they were? What is the object of drill-work—intellectual development or increased ease and rapidity of use and permanency of retention? Is intellectual development possible except in the first few presentations? Is the shortest way of learning a thing necessarily the best way if we desire intellectual development? Why?

Habit and Heredity.—At birth both animals and men have tendencies to various kinds of acts. The performance of acts may increase natural tendencies, may decrease them by acts in opposition to them, or may develop new tendencies. In which are these natural tendencies most prominent—in men or animals? In answering, compare a young babe, as to what it can do, with various young animals. In which may natural tendencies be most modified and new tendencies developed by habit, or, in other words, experience, education, or training? In answering this, compare the adult with the young of the same species as to what they can do, and have tendencies to do; and also the educated and trained individual with the uneducated and untrained.

All natural tendencies that are common to all individ-

uals of a species are instincts (though there is some reason for looking upon them as habits of the race developed through the experience of many generations.) Natural tendencies not common to the species, but possessed only by certain individuals or families, are known as inherited characteristics, in the narrower meaning of the word inherited. The individual peculiarities spoken of at the beginning are partly inherited and partly the result of habit; and so all that any person is in body and mind, in disposition, character, and actions, may be supposed to be due to these two factors. The educator has power over but one of these factors—habit—and is concerned with the other only so far as a knowledge of inherited characteristics enables him to better direct the formation of habits, so as to produce the desired modification.

Is it true that people in the same surroundings and subjected to the same educative influences often develop in entirely different directions, mentally and morally? If so, why is it? Is it due entirely to difference in inherited tendencies which were very great at the beginning, or could it be explained on the ground of little or no differences in inherited tendencies? Take into account all of the principles learned in regard to the formation of habits, especially as to the effect of earlier repetitions of an act in deciding this question. Notice to what extent a like or dislike for certain subjects is the result of experience, especially early experience, in connection with those subjects. Is it possible for two individuals to be developed in different directions by being under the same rules? by the same subject? by

the same lecture or sermon? by the same book or work of art? Illustrate in each instance. Notice in applying the general principles of habit to particular cases that the important thing to find out is what activities or feelings are being exercised, then we can know what tendencies are being developed.

Habits and Ideals.—Men have ideals of what they wish to be and try to work toward them; animals probably do not. Give reasons for believing this statement, if you believe it. A teacher has ideals of what he wishes the child to become, and directs the formation of his habits toward the attainment of that ideal which the child may or may not know. When one has ideals himself, and directs the formation of his habits toward the attainment of those ideals, he is educating himself. The teacher may help a pupil by leading him to form good habits, saying nothing about ideals; or he may direct most of his effort to forming in the mind of the pupil ideals—teaching him to know and appreciate what is valuable and right. The question, “Which is the most important, to form right ideals or right habits?” is a good one for discussion. Which is the best system of education, that in which everything is so arranged that habits of punctuality, neatness, order, accuracy, and conformity to all political, social, and moral laws are developed, while no special attention is paid to the ideals the children are forming, or that in which care is taken that pupils form correct ideas of these things and are led to appreciate them highly, but no particular attention paid to the formation of fixed habits of any kind? Discuss the question with reference

to various concrete cases. Notice whether habits ever influence ideals as well as ideals habits. Also which comes first in the life of the child, which method of education produces the highest type of character when well carried out?

CHAPTER VII.

CHILD STUDY.

It is now recognized more than ever before that the only way to determine what is the best system of education is by studying children to find out their natural tendencies, and the effects upon them of the various educational forces that may be used. This means that children must be studied scientifically, just as are plants and animals, and that the general truths thus discovered shall be used in planning courses of study, just as the general laws of plant and animal growth are used in agriculture and stock-raising. Accordingly, many facts are now being collected by individuals, associations, and schools for the purpose of establishing general truths in regard to child nature.

It is also being recognized more and more by practical educators that a teacher cannot possibly direct the mental and moral development of pupils intelligently, unless he knows the peculiar characteristics, tendencies, and attainments of each pupil. It is just as necessary for him to know the condition of the pupil's mind as it is for the doctor to know the condition of the patient's body. Many teachers, without attention being called especially to it and without help, study their pupils

and come to know them quite thoroughly; others will never do this of themselves, and all may be helped by suggestions. The following suggestions have been found very helpful to normal students who were engaged in practice-teaching, and in observation of class-work. It is believed that they will be helpful to all teachers who wish to know their pupils better and teach them more intelligently. It is best to take only a few points under one topic at first, then a few more, and so on, until one has formed the habit of observing in regard to all the points suggested.

ATTENTION.

I. THE CLASS AS A WHOLE.

1. Are they attentive—
 - a.* To what the teacher says and does.
 - b.* To the recitations of the members of the class.
2. State specifically what you observed in—
 - a.* Motions, attitude, or expression of face.
 - b.* Answers to questions or attempts to follow directions that led you to infer that they were or were not attentive.
3. Try to discover as many causes for their attention or inattention as possible, taking into account—
 - a.* The nature of the subject-matter.
 - b.* The knowledge and mental powers possessed by the pupils.
 - c.* (1) The order of presenting the subject matter.
(2) Clearness of language and illustrations used.
(3) The movements and tone of voice of the teacher.

To what extent is the subject-matter new, and to what extent familiar? Are they able to comprehend the new and see its relation to something in which they are already interested?

Is what is presented sufficiently difficult to require strict attention? Is one part dependent upon another, so that continued attention is required?

Does each pupil feel the responsibility for what is presented, and that his knowledge is likely to be tested at any moment?

In what way is he led to feel this responsibility, or how may he be led to feel it?

II. INDIVIDUAL PUPILS.

1. Is the pupil less or more attentive than the others?

2. Is this difference permanent? If not, under what circumstances is he attentive? If inattentive all the time, determine (*a*) whether any of the points mentioned above apply to him in an unusual degree; (*b*) whether defects of eye or ear or unfavorable position for seeing and hearing are the cause. If the inattention seems to be merely a habit, try to find out how that habit can be broken up.

PERCEPTION AND APPERCEPTION.

I. THE CLASS AS A WHOLE.

1. Note whether—

a. The conditions (light, distance, angle of vision, size of object or letters, etc.) are favorable for seeing and hearing.

b. The class is attentive.

2. Note whether—

a. The thing being examined is perceived as a whole or its elements noted.

b. Essential or non-essential characteristics are noted.

c. How the pupil's attention is or could be drawn to essential characteristics.

Whatever is presented can be apperceived only by means of knowledge already possessed by the pupils.

1. Note, therefore—

a. Whether the matter being presented is like or related to anything experienced by the pupils;

- b.* Read or heard by them ;
- c.* Taught them in school in the same or other subjects.

2. Note:

- (*a*) Whether the teacher expressly calls up this knowledge in presenting the subject-matter.
- (*b*) Whether, if she does not, they show that they have done so themselves.
- (*c*) Which of the three classes of knowledge indicated in (1) they most frequently and pleasurably call up.

3. Notice whether in apperceiving the new by means of the old, they discriminate differences as well as similarities ; or whether they incorrectly ascribe characteristics of the old to the new.

II. INDIVIDUAL PUPILS.

1. Does your pupil perceive more or less perfectly than the rest of the class ?

2. If less, determine whether—

- a.* It is due to defects of eye or ear.
- b.* Unfavorable position for seeing or hearing.
- c.* Want of attention.
- d.* Unusual slowness in perceiving.
- e.* Want of some knowledge possessed by others.

3. If more, determine whether it is due to—

- a.* Closer attention and better discriminative powers, or,
- b.* Better or more apperceptive knowledge.

4. In either case, note carefully—

- a.* Extent.
- b.* Kind of apperceiving knowledge.
- c.* The tendency to call it up himself manifested by the pupil, and determine how far this accounts for unusual good perception, or suggests how imperfect perception may be improved.

IMAGINATION.

I. THE CLASS AS A WHOLE. Note :

1. What kind of mental images the lesson requires the class to form.

2. Whether the pupils probably have the materials with which to form them.

3. Whether they are required to use reproductive, constructive, or creative imagination, and how well they succeed.

4. What means (pictures, diagrams, descriptions, comparisons, etc.) are or could be used to help them to correct and vivid mental images.

5. How these mental images will help to a more perfect comprehension of the subject.

6. What valuable training of the imagination is given by the exercise.

II. INDIVIDUAL PUPILS.

Determine whether your pupil has more or less power of imagination of any kind than the others. If he seems to have more, note :

1. Whether he ever becomes more interested in his own fancies than in his lessons.

2. Whether it ever leads him to perceive or relate things inaccurately.

3. Whether he seems to realize more vividly than others scenes and events described.

4. Whether he remembers better than others what is associated with diagrams and word-pictures, and less perfectly what is not.

5. Whether he remembers the picturable part and not the more important truths associated with it.

6. Whether—

a. He can readily reproduce drawings from memory.

b. He can draw what is described.

c. He can make new designs.

7. Whether—

a. He can readily reproduce narratives and descriptions.

b. He can write imaginary ones.

If he seems to lack imagination, note deficiencies in any of the above points.

In either case try to determine what methods may best be used :

1. In imparting information.
2. In training the imagination—
 - a. To reproduce accurately.
 - b. To construct correctly.
 - c. To create complex things in accord with the laws of nature or good taste.

MEMORY.

A perfect act of memory requires that we shall retain, recall, and recognize previous mental experiences.

I. *Retention* depends mainly upon the intensity of the impression.

1. Hence all of the conditions affecting attention and perception during acquisition will affect retention, and they should therefore be noted.
2. In addition, you should determine, as far as possible, (a) what kind of mental images are used ; (b) whether the number of things to be remembered is too great ; (c) whether the repetitions are numerous enough.

II. *Recall* depends mainly upon association. Note, therefore, when the pupils are learning :

1. The order in which the facts are associated.
2. Whether they are (a) grouped around some central fact ; (b) associated with an object, picture, diagram, or vivid word-picture.
3. Whether the facts are associated either with the pupil's own experience or with other facts.

When the pupils are recalling, note :

1. Whether they give the facts in the same order in which they learned them.
2. If not, do they give them haphazard or connectedly.
3. If connectedly, what kind of association predominates : (a) time and place ; (b) cause and effect ; (c) similarity and contrast.

III. *Recognition* means that a fact when recalled or presented

again shall seem familiar, and that some facts or fact associated with it in the original acquisition shall be recalled with it. Note, therefore :

1. Whether the pupils correctly recognize the facts they recall.
2. Whether they ever recognize accurately, when stated, what they themselves are unable to recall.
3. If so, is the inability to recall it because (*a*) the question was not asked in a suitable way, or (*b*) they have not associated the facts in such a way as to know how to recall them, or (*c*) they have not practised recalling them.

In any case, what suggestion can be given that will aid in more perfect recall and recognition ?

CONCEPTION.

Be continually on the watch to discover what words mean to the pupil, and how that meaning is changing for them.

1. Determine whether the probable source of his concept is—
 - a.* Direct association of the word with the thing or experience signified.
 - b.* Study of description or definition.
 - c.* Hearing the word used with other words.
2. Determine whether his concepts are correct or incorrect, and whether they are too narrow or too broad, including what that should be excluded from the class.
3. Are his concepts of the first, second, or third degree of definiteness, and to what extent can he recognize characteristics that he can name, and *vice versa* ?
4. In forming new concepts, notice how many and what variety of examples are necessary before he can discover the essential characteristics so as to know the basis of classification or the definition ?
5. In classifying, notice whether the mistakes are due to imperfect discrimination of the qualities of the thing being classified or want of knowledge of the essential qualities of the class.

REASONING.

1. Notice whether the pupil has a tendency to make inferences ; and if so, whether it is mainly in applying general truths already learned or in making general statements from one or more particulars.
2. The basis will always be some kind of apparent similarity : note therefore—
 - a.* What the seeming likeness is.
 - b.* Whether it is essential.
 - c.* Whether the general truths about the class having those characteristics are correctly related.
3. Notice whether defective reasoning is due to—
 - a.* Imperfect concepts.
 - b.* Want of accurate discrimination of characteristics.
 - c.* Want of power of attention to hold two or more things in mind.
 - d.* Lack either in knowledge of general truths necessary to the inference or in the tendency to recall them.

For the study of pupils outside of school and the collection of facts that may be of scientific value, the following general outlines may be used with advantage:

SUGGESTIONS FOR THE STUDY OF CHILDREN.**I. GENERAL FACTS.**

(*a*) Name of observer ; (*b*) name of child ; (*c*) sex ; (*d*) age ; (*e*) birthplace (state or country) ; (*f*) birthplace of father ; (*g*) of mother ; (*h*) occupation of father ; (*i*) education of father (common-school or college ; (*j*) of mother ; (*k*) ages of brothers and sisters, if any ; (*l*) other inmates of the family ; (*m*) intimate companions ; (*n*) number and kind of books, papers, and magazines in the home ; (*o*) portions of life spent in (1) city, (2) village, (3) country ; (*p*) journeys taken ; (*q*) amount and kind of instruction given (1) at home, (2) in kindergarten and school ; (*r*) other important environments or influence, including natural scenery and social organizations.

II. PHYSICAL CHARACTERISTICS.

1. *Description of Body and Features*: (a) large or small for age; (b) slender or stout in build; (c) color, amount, and characteristics of hair; (d) color, size and brightness of eyes; (e) hair-line high or low on head; (f) *forehead*, high or low, bulging, straight or sloping, wrinkled or smooth; (g) eyebrows, scanty or full, arched or straight, meeting or separate; (h) nose, large or small, thin or broad, pointed or pug, straight, or curved; nostrils, large or small; (i) *lips*, thick or thin, curved or straight, equal or unequal in size; (j) mouth, large or small, character of wrinkles about it; (k) teeth, large or small, white or colored, regular or irregular, sound or decayed; (l) chin, large or short, pointed, blunt or dimpled, point on a line with mouth, in front, or back of it; (m) character of curve from lip to point of chin; (n) eyes, deep set or well forward, full or hollow under them, smooth or wrinkled around them, lashes numerous or scanty, long or short; (o) cheek-bones high and prominent or not, cheeks round, full, or hollow; (p) shoulders, broad or narrow, round or square, stooped or straight; (q) body, flat or round, straight or bent, chest depressed or full; (r) describe any other physical peculiarities.

2. *Measurements of Body and Head*: (a) Height (1) standing, (2) sitting; (b) weight; (c) reach (arms extended); (d) distance around head just above the eyes; (e) distance from the opening of one ear to that of the other, (1) straight over head, (2) in front just at hair line, (3) in rear over greatest prominence, (4) in front just above eyes, (5) around point of nose, (6) across the chin; (f) distance from hair line (1) to occiput, (2) to central part between eyes, (3) to point of the nose, (4) to point of the chin; (g) circumference of neck; (h) (1) height of ear, (2) width; (i) distance (1) from right ear to central point between eyes, (2) to point of nose, (3) to point of chin; (j) distance from left ear to points 1, 2, and 3, above; (k) remarks.

3. *Attitude and Movements*: (a) Position and characteristic movements of (1) head, (2) eyes, (3) body, (4) arms and hands, (5) legs and feet; (b) frequency, regularity, grace, rapidity, accu-

racy of movements in work and play and in special tasks or tests ;
(c) expressiveness of face.

III. MENTAL CHARACTERISTICS.

Observe and report as many *facts* as you can bearing upon the following points :

1. *General* : Evidences of influence of special environment or of independence of it.

2. *Interests and Attention* : Extent to which he is interested in games, occupations, objects, reading matter and kinds of each most liked ; kinds of things most attended to ; length of time attention is given to one thing ; power of voluntary attention.

3. *Senses* : Perfection or imperfection of sense organs ; power of discrimination with each ; which most used.

4. *Perception and Apperception* : Rapidity and accuracy of perception ; tendency to call up things that are being perceived ; readiness in noting relations.

5. *Imagination* : Vividness and accuracy of his reproductive and constructive imagination ; tendency to use creative imagination and character of creations.

6. *Memory* : Readiness in acquiring retentiveness, accuracy ; kind of facts learned best ; kind of mental images used ; relative goodness of memory for words, for ideas and for experiences ; inequality of power to recall and to recognize.

7. *Association* : Kinds most prominent in thinking ; logical consistency of ideas.

8. *Conception* : Definiteness of concepts ; modification of them ; tendency to generalize and accuracy of generalizations.

9. *Reasoning* : Tendency to reason inductively or deductively ; basis of reasoning, accuracy.

10. *Habits* : Readiness in forming ; permanency ; power and tendency to change them ; similarity of actions from day to day ; order and system in doing things ; neatness in personal habits.

11. *Sensory Feelings* : Sensitiveness to pleasant and painful sensations, general and special.

12. *Feelings of Activity* : Evidence of feeling experienced in

motion, in perceiving, in using the different kinds of imagination ; in memory ; in classifying things ; in forming general notions and in reasoning.

13. *Self-feelings* : Existence and prominence of self-consciousness, bashfulness, confidence, pride, fear, anger, regard for self.

14. *Sympathetic* : Sympathy for persons, animals, or things ; sense of humor.

15. *Sentiments* : Love of truth, appreciation of beauty ; regard for the right.

16. *Social Tendencies* : Desire for companionship ; tendency to lead or follow ; regard for pleasures of companions.

17. *Disposition* : Cheerfulness, evenness, tractableness.

18. *Imitation* : Power to imitate accurately ; tendency to imitate.

19. *Self-control* : Power of self-control ; tendency to control.

20. *Will* : Tendency to direct own actions, to follow example, suggestion, or command ; relative prominence in willing of impulses or of ideals of the proper thing to do ; relative importance of near as compared with remote good or ill as motives to action ; rapidity of decision as to course of action ; time elapsing before acting ; perseverance in carrying out a plan ; firmness in adhering to a plan once adopted.

PART II.

Feelings.

CHAPTER I.

FEELINGS IN GENERAL.

Nature and Variety of Feelings.—Everyone knows what feeling is by experience better than it can be known by means of any definition. When we observe our own states of consciousness we find that feelings are a more or less important element in *all* our mental operations, and a moment's reflection shows us that those states of consciousness are *ours* by virtue of the feeling element in them. You may say "I am perceiving the objects in this room," "I am imagining the objects in the next room," "I am remembering the appearance of a room at home," "I am reasoning about the cost of those in this room." It is because feeling is an element in these mental operations that you can say "*I*" am doing this; and it is for the same reasons that you can know that you are perceiving objects in this room instead of imagining them, remembering them, or reasoning about

them. You know which you are doing because these various operations *feel* different. In all mental processes we feel that it is *we* who are being affected, *we* who are active, and the more prominent the consciousness of *self*, the stronger the feelings. Notice how differently you are affected when you are called on to recite from what you are when another is, or when you observe your own failure or success rather than that of another. Notice, also how differently you are affected by the same items of news when they refer to strangers, to friends, to near relatives, or to yourself. Give other illustrations of increase of feeling with increase in closeness of relation to self.

The personal nature of feeling becomes still more evident when we reflect upon the fact that we can impart to others our ideas, but not our feelings; also, that any number of persons can go through the same intellectual operations and each may know that the others have done so: but as to the feelings experienced, they may differ widely, and each person knows only his own. Knowledge is more universal, feeling more individual. If a dozen persons go into a room, look at certain objects, and listen to certain sounds, they all acquire practically the same knowledge; but the feeling experienced in acquiring that knowledge is peculiar to each individual and makes the knowledge *his*. It is true that knowledge takes various forms, according to the ideas already in the mind of the individual acquiring it; but knowledge has a universal element in it, while feeling is in its very nature individual.

Since feeling is an element in *every* state of conscious-

ness, the varieties must be infinite. Feeling results from the universe of external things affecting us through the senses in countless ways, and from our own activities, which are almost equally various. The feelings are the *self*-side of all experience, and hence are as various as the experiences. Most of them are in a greater or less degree agreeable or disagreeable to us, or a mixture of both; but some feelings, such as astonishment, are strong, but not especially agreeable or disagreeable. It is therefore entirely too narrow a view of feeling to say that its distinguishing characteristic is pleasure or pain, even though we give a broad meaning to those words. It were better to say that any conscious modification of the self is feeling, and that the varieties are as great as are the modifications.

Importance of Feeling.—Feeling is the interesting side of all consciousness. Notice if feelings present or expected are not the standard by which all things are measured. Ask yourself what any material thing is worth, as apples, iron, horses, gold, pictures, and follow the questions back to the ultimate source of value and see if you do not come to a feeling. Do not feelings produce our economic, artistic, and social needs, and serve as the ultimate standards of value in those spheres? Ask yourself why any subject of knowledge is valuable, and see if its value depends upon feeling. Ask a similar question as to why one should obey moral and religious rules. Notice also, and illustrate, how feelings influence learning and action, determining what shall be learned and what shall be done.

Methods of Studying Feeling.—You can assert posi-

tively that a person with normal senses will, when placed where you are now and under the same conditions, see and hear what you see and hear; but can you assert with equal assurance that he will experience the same emotions? If a man asserted that he did or did not experience a certain feeling under certain conditions, could his statement be shown to be false—as it could if he asserted that he did or did not hear a certain sound? It is evident from this and from the fact that feeling is in its very nature subjective that feeling must be studied largely by the subjective method. The nerves and muscles concerned in expressing emotions may be studied objectively, but the feelings themselves cannot be studied by this method. The indirectly subjective method can, however, evidently be used.

From the recorded results of subjective study of feelings can we get as many and reliable *general* truths in regard to feelings as we can in regard to intellectual processes? You can answer this by answering the following minor questions: (1) Are individual differences greater or less in feeling than in intellect? (A proverb says, "There is no accounting for tastes.") (2) Which can be most perfectly expressed in words—feelings or ideas? (3) Can the feelings be tested by other forms of expression and by experiment, as can the intellectual powers? Almost the only important result yet gained from the use of experiment, in the study of feeling is the general truth, that a cross is most agreeable to the majority of persons when the horizontal line is a mean proportional to the two parts of the vertical. It is possible that more general truths may be obtained by ex-

periment; yet if any individual should assert that a different proportion is more agreeable to him, his statement would be final. He could not be proven in error as he could if he asserted that the longer part of such a cross is the shorter, nor could we assert that he is mentally defective.

As to the study of feelings by means of external signs, it is evident that many facts may be gained by inferential observations. Can facts be gained in this way in regard to feeling more or less readily than in regard to the intellectual operations? Illustrate. Is it of much advantage to a teacher to be able to study the feelings of pupils in this way? Why?

Signs of Feeling.—Mention some of the more common signs of feeling. Are the signs for all the stronger emotions, such as anger, fear, sorrow, plainly perceptible? Is it not probable that there are signs for *every* emotion, even the slightest, though not easily perceived, as are those of the stronger feelings? One fact bearing on this is that an instrument suited for measuring blood-pressure shows a variation in pressure when only a very slight emotion is experienced. Give your reasons for believing that there is or is not a sign for every feeling.

Are some of the signs of feeling universal—common to all men? You may get an answer to this question by noticing whether you can interpret the signs of feeling manifested by strangers, and those represented by artists, sculptors, novelists, and elocutionists. Mention specifically some instances where feelings can be “read” by means of such signs. Are there some signs peculiar to certain individuals, so that a stranger to the person is

liable to misinterpret them? Illustrate. Are signs of feeling the result mainly of habit or of natural tendencies? In answering this, notice whether children make the appropriate signs of feelings more or less perfectly than adults, and whether any one has to learn how to correctly express an emotion that he feels. Mention some signs of feeling that are natural and some that are learned. Which do you think are most largely the result of habit—the universal or the individual signs? Why?

Connection between Feelings and their Expression.

—Experiment by assuming the attitude and expression of various feelings, as pride, anger, shame, joy, sorrow, and notice whether after a time the corresponding feelings are experienced in any degree. Try also assuming the signs of any feeling, as humbleness, while trying to feel another, as pride. When you are experiencing a certain feeling, as anger, what is the effect of giving expression to it? What is the effect of refusing to give expression to it—inhibiting the signs? If one were to continue to give expression to one kind of feeling, as the pleasant, and to refrain from expressing the opposite, would one's disposition be modified in any degree after a few months or years? Is producing or inhibiting signs of feeling an important means of controlling and developing feeling?

It is generally recognized that men in the army often develop what is called a military type of character. Is it probable that the movements and attitude of military drill are important factors in producing such a character? Could the military type of character be developed if everything in army life were the same, except that

the movements were graceful instead of precise? Do the movements in any system of physical culture have any effect, when long continued, upon the feelings and character? Is the effect great enough so that it should be taken into account in choosing a system of physical culture or gymnastics? Have you ever been able to notice any correspondence between a person's movements and his mental characteristics? It is probable not only that the connection is closer than has usually been supposed, but that in the future movements will be recognized as an important means of developing feeling and intellect. The principle is already recognized by some instructors in physical culture and manual training.

Some think that the relation between feeling and the signs of feeling are still closer. They hold that not only are there signs for every feeling, but that neither the signs of a feeling nor the feeling itself can exist separately. It is held, on the one hand, that if a feeling is experienced it will be expressed in spite of any attempt to conceal it, and that a sufficiently skilled observer could perceive the signs and infer the feeling. Do you believe this? On the other hand, it is held that producing the signs of a feeling produces the feeling. The older teachers of elocution ignored these views. They held that there are certain universal signs for each feeling which the student of elocution must learn, then when a certain emotion is to be expressed he must assume the attitude, expression of face, tone of voice, and gestures that are the signs of that emotion. The training was principally in imitating the signs of the various feelings. The modern elocutionists have an entirely different theory.

They hold that every feeling naturally results in the appropriate signs and hence after one has got rid of unnatural habits of expression and exercised all the muscles so that they are free and responsive, all that is necessary is to enter into the spirit of the selection and *feel* the emotion to be expressed and the signs expressive of the emotion will result. It is probably true that most good elocutionists and actors feel the emotions they are trying to express. Recall any instances that you know of, also your own experience in reading or reciting, in conformation or opposition to this last statement.

Prof. James holds that the bodily changes accompanying an emotion are the *causes* of the emotion, not the result. That the perception of a frightful object, for instance, produces bodily changes in the way of movements, cries, quickened or slowed breathing and heart-beat, etc., and that these bodily changes produce the *feeling* of fright. Without them there might be the intellectual *perception* of danger, but no *feeling* of fright. The fact that some persons can express very perfectly the signs of a feeling without experiencing the feeling in the slightest degree, and that with most persons the repression of the signs of certain feelings not only does not repress the feeling, but often increases it (as refraining from laughing when amused or, sometimes, refraining from crying when grieved), seems against this theory. However, it is not necessarily so, for the bodily changes accompanying a feeling are of two kinds—external and internal. The external changes in the form of attitude, expression, gestures, and tone of voice can be observed; but the internal or visceral changes in heart,

lungs, and intestines are felt by the individual, and cannot be observed readily by others. Usually, it seems, the external and the internal changes correspond, and the production or inhibition of one produces or inhibits the other. They may be separated, however, and probably are, in the actor who has learned to produce the external signs of a feeling without expressing it. When one inhibits the external signs of a feeling, sometimes the internal changes instead of being inhibited are made all the greater; hence the result is an increase instead of a decrease in the feeling.

The part that attention plays in these instances should not be ignored. If one keeps the attention fixed upon the amusing thing, the frightful thing, or the object of anger, will he not experience the feeling even though he inhibits the external signs, and if he turns the attention to other things will not the feeling disappear? Illustrate from your own experience. If this be true, then may it not be that producing or inhibiting the signs of a feeling influences the feeling mainly because it helps to keep the attention on the cause of the feeling or helps to turn it to something else? If this be admitted, however, the importance of control of the signs of feeling as a means of influencing the feeling is in no way lessened, is it?

Feeling and Habit.—We have already seen that there is some feeling accompanying every mental process; and now the question arises as to what change if any takes place in the feeling if the act or process is repeated over and over again. Does it remain the same or decrease? Compare the feelings you now experience with those

first experienced in the following instances: reciting in class, talking to certain persons, going to certain places, performing common tasks, as writing, knitting, winding a watch. Can the feeling become so slight that it will not be great enough to make us conscious of the act? Illustrate. Where there is strong feeling of pain or pleasure at first performance, does it ever become less as repeated, then change into the opposite? Illustrate. If that should be the case, what would be the effect of continuing to perform the act for many years? Would the second feeling decrease after many repetitions of the act, so that there would finally be little feeling accompanying the act?

In the above we were talking about the effect of performing the same act, mental or physical, again and again, upon the feelings that accompany it. We are now to consider the effect of calling forth the same kind of feeling again and again, the object calling forth the feeling varying. What is the effect of calling forth frequently the feeling of anger? Sympathy? Pride? Shame? Do those feelings become more prominent and more easily called forth? Illustrate. State in words the two general laws in regard to feeling suggested in this and the preceding paragraph. The first might be called the law of accommodation, the second of development. Sometimes these two laws seem to oppose each other, as in the experience of a physician who has much to do with suffering, and the resulting effect upon the feelings is uncertain, so that he may grow more sympathetic or less so.

Change.—The general questions to be considered are:

Can feeling result from the continuance of the *same* conditions or causes of feeling, or must there be *change* to produce feeling? and, Do the feelings vary in intensity with the amount of change? Does one enjoy wealth who has never known anything else; or one who has never had luxuries, to know what they are, suffer for the lack of them? Recall some things that gave you great pleasure when you first came into possession of them, and notice whether the possession of them now causes any pleasure (only as you contrast in thought your former experience without them).

Consider sensations of various kinds, and notice whether those stimuli that continue constant or change very gradually produce any feeling or even consciousness. Do you feel the ring on your finger or the collar around your neck (when you do not move)? If a room becomes warm *very* gradually will you know it? Have some one pour water or sand very slowly in a small vessel resting on your hand (you closing your eyes) and notice whether you can feel the *increase* in pressure. Are you affected by the ticking of the clock and other constant sounds? Has it ever become quite dark in your room because the sun has gone down, or a lamp gone out without your knowing it was getting dark for some time? Which is the most favorable condition for the unconsciousness of sleep—when the light, sounds, and temperature of a room remain the same, or when they change suddenly and irregularly? If it were possible for *every* stimulus to the senses to remain constant for five minutes, could one remain conscious, or is change necessary to consciousness? A boy who had lost all

sensation except in one eye and one ear usually went to sleep very quickly if they were closed.

Mention instances showing how change produces attention or intensification of consciousness. Think out as many applications of this principle of change in education as you can.

Contrast.—Mention a half-dozen pairs of sensations and emotions that are contrasts of each other. Is the feeling stronger when one of the pair is experienced immediately after the other than under other circumstances? Illustrate. What is the reason? You will get a partial answer if you define contrast in terms of change and then apply the general truth in regard to amount of change and intensity of feeling.

There is an old saying that "If you laugh before breakfast you will cry before night," which implies that after having experienced one feeling there is a tendency to experience the opposite. Can you give any evidence of the truth of this? Fatigue is probably partially the reason. An illustration in the realm of sensation may be obtained by looking fixedly at a red spot till the eye is fatigued, then looking at a gray or white surface.

The use that is made of contrast in literature and oratory is very marked. Did you ever hear an address that was humorous all the way through, or one that was pathetic from beginning to end? Have you ever noticed a speaker passing from one to the other? Do you know of many stories or plays in which all the characters are very good or all very bad? Mention some instance in literature in which contrast is used effectively. Make a list of twenty words that are frequently used in contrast.

Relativity.—Will the same stimulus produce the same effect every time? For instance, will a weight of an ounce produce the same feeling when added to an ounce weight on the hand as when added to a ten-pound weight? a scratch of a pin when the hand is being stroked as when a hand is being amputated? a piece of candy after a spoonful of syrup and one after a spoonful of vinegar? Give other illustrations. Will the same cause of an emotion always produce the same emotion? For example, will the loss of a dollar produce the same feeling when a man has but five, as when he has five hundred? Will an appeal to one's sympathies when one is engrossed in business or study have the same effect as when one is unoccupied and has recently experienced similar sufferings? If you wish to excite a certain feeling in another do you choose your time? Give other illustrations. Do you think the same cause of feeling ever produces *exactly* the same feeling twice, or does the feeling always vary with the condition of consciousness at the moment when the cause affects it—the present feelings or those that have recently been experienced? Do you think that we may say that the effect anything produces upon consciousness is not fixed and absolute, but variable and relative to present and immediately preceding states of consciousness? Give evidence to prove that the effect of any stimulus or idea upon consciousness varies with the *kind*, *amount*, and *suddenness* of the change it produces in consciousness? You will find some by referring to the examples given in studying change and contrast.

Recall the psycho-physical law. Is that anything

like the law of relativity? Is it not simply one phase of the general law of the relativity of all mental states?

Recall also what you have learned about apperception. In studying that, you found that ideas gained from any presentation varied with the ideas already in mind. Do you not now see that feelings vary with feelings previously experienced?

Pleasure and Pain.—From the earliest times attempts have been made to formulate some general law in regard to what is pleasurable or agreeable and what is painful or disagreeable. That and the purposes of pleasure and pain are the most important questions that can be asked in regard to them. Touch your hand *very* lightly with a pencil, then press the pencil gently against the hand, and then very hard. Does the sensation go through three stages—the first slightly disagreeable, the second agreeable, and the third painful? Experiment and recall your experience with other sensations when slight, moderate, and intense stimulations are used, and notice which degrees of stimulation are pleasurable and which painful. Move your arm around in a circle just as slowly as you can, then with moderate rapidity, then as fast as possible, noting the character of the feeling in each case. Recall also your experience with other forms of physical activity and also with the various forms of mental activity. Is there sufficient ground for saying that all activity, including that of the sense organs when stimulated, is pleasurable when moderate, and painful when very slight and when excessive? Are there any exceptions—some activities

that are more painful in every degree than no exercise whatever of this power, would be? Illustrate.

Some say that the statement of the general truth in regard to pleasure and pain is more correctly expressed by saying that all activities (including those of the sense organs) that are for the present good of the organism (heighten the tide of life, increase the life forces at the time), are pleasurable. The later effects, such as result from the use of stimulants, is not here considered. Would this law correspond with the preceding so far as degree of activity is concerned? That is, are the moderate degrees of activities usually good for the organism and too slight or excessive activities injurious? According to this law, however, there may be various kinds of activities (or rather of objects exciting activities, particularly those exciting the organs of taste and smell) that even in a moderate degree are not pleasurable and it asserts that such are not good for the organism. Aristotle said that all normal and natural activities are pleasurable; and this, though vague, probably expresses the essential truth of the two laws just stated, for few would say that they would hold true of persons in an abnormal or unnatural state, as the result of inheritance, sickness or habit. It expresses confidence in natural tendencies, which is now, perhaps more than ever before, felt by people generally. Physiologists are more than ever before inclined to say, Let children (and older people too) eat what they like best, and permit the child to exercise as he chooses. They affirm that the desire for sweet in children expresses a real physiological need, and the tendency to physical activity if allowed free

scope will produce the best physical development. Educators and moralists also are beginning to believe that those studies which are pleasurable to the child are the best for his intellectual development, and that what excites pleasurable feelings is, generally speaking, better for the moral development than what excites painful feelings. Children are being studied to-day in the belief that if we can find what they naturally like to learn and do, we shall then be able to improve our courses of study by putting in them the subjects and exercises that the children enjoy. The chief difficulty, however, is in determining what is natural and normal, and what is the result of habit or is abnormal.

There is a common saying, that "One can get used to anything;" and some are so much impressed with the power of the law of accommodation that they think the feelings are determined more by it than by natural tendencies. They hold that if anything is eaten, perceived, thought of, or any action performed frequently and for long enough time, that one will finally find it more pleasant than something else, though it were ever so painful at first. Give some specific examples. Prisoners after long confinement sometimes find freedom unpleasant, and ask to be readmitted. Give other illustrations of this principle. Some who hold to this view broaden it by looking upon instinctive tendencies as habits of the race developed by the surroundings in which the ancestors of the species or race have lived, and say that animals and men take pleasure in the acts they tend to perform, whether those tendencies were developed by the action of ancestors or by those of the

individual. Notice how far the law stated in this form corresponds with the other two, and point out the differences.

It differs from common belief in asserting that we take pleasure in what we tend to do instead of tending to do what will give pleasure. It makes pleasure the effect instead of the cause. This seems a beneficent arrangement, that we should come to take pleasure in what we do, but offers no explanation of the purpose of pain. In the view that pain and pleasure are causes of action it may be claimed that pain tends to prevent us from performing acts that do not lead to the highest development and ultimately to the greatest happiness. There is good reason to believe that there is truth in both views; that according to the law of accommodation pleasure is the effect of long continuance of the action it accompanies, and also that pain and pleasure may modify action and thus act as causes. If conditions admit, there is modification of actions; if not, accommodation to them, so that they finally become pleasurable.

CHAPTER II.

SOURCES OF FEELING, AND RELATION TO MENTAL PROCESSES.

Classes of Elementary Feelings.—The most important sources of feeling are sensations. Just as they are the fundamental sources of knowledge, so they are of feeling; but the relative importance of the general and the special sensations is reversed, the former being more important to feeling. Give examples illustrating the truth of this. The second important source of feeling is mental images of sensations in which feelings were prominent and mental images of things incidentally associated with strong feelings. The third important source of feeling is the feeling of activity. The feelings accompanying the various intellectual processes, we shall see later, may be traced to these three or four sources.

General Sensations.—The common greetings “How are you,” “How do you feel,” probably refer primarily to the general sensations being experienced, and indicate the importance of those sensations. Our health and happiness depend very largely upon them, and by them we know whether we are sick or well, tired or rested, languid, or vigorous, weak or strong, hungry, thirsty, and chilly or satisfied and comfortable. When

you are in perfect health and bodily wants satisfied, do you notice those feelings much? Do you when sick? Are they prominent when health has just been recovered? Is it likely that they are present all the time in health, only not noticed after health has been the same for some time? Are one's thoughts and moods modified by the bodily condition through these general sensations? Illustrate by individual examples, and also by examples of differences in the mood of a company on different days or different times of day. Is it important morally and intellectually that pupils should be comfortable in school? Is one's disposition modified if certain bodily conditions continue for a long time? Illustrate.

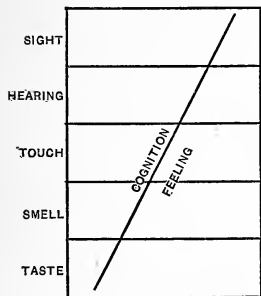
If the general sensations are always present, may we not consider them as important elements in maintaining consciousness, and that they serve as a sort of background to the field of consciousness? If so, then since the effect of anything upon consciousness varies with the condition of consciousness, we should expect not only that it would vary with changes in those general sensations in any individual, but also that the sensations being different for different individuals they should be affected differently by the same things. Is it not probable, then, that temperament or disposition depends primarily upon the character of the general sensations? Since these sensations are always present from the very dawn of conscious life (and the most prominent in early life), is it not probable that they are important elements in giving an idea of self as a permanent existence? This view is favored by the fact that sickly children usually de-

velop self-consciousness early, and by the fact that a patient suffering from great bodily disorder sometimes thinks that he is a different person.

The Special Sensations.—Every sensation has in it an element of feeling, and is also a source of knowledge. Which is the most prominent cognition or feeling: when one is smelling of a rose in the garden or of a chemical substance in the laboratory? serving as a tea-taster or drinking tea at the table? searching for a match in the dark or passing the hand lightly over soft velvet? looking at a display of fireworks or looking at a star to determine to what constellation it belongs? listening to the playing of a musical artist or trying to identify a certain locomotive whistle? Give other illustrations of the use of each of the senses as a means of gaining knowledge, and as a means of gaining feeling, not counting those instances in which the feeling is not the immediate result of the sensation, but the result of ideas suggested by the sensation, as when the sight or news of a friend brings up pleasant memories. Which ones of the special sensations are most like the general sensations, and most closely connected with the bodily welfare? Which ones of the special senses are most used in gaining knowledge, and relatively least used in experiencing feelings? In which does feeling most predominate? State whether the diagram given below correctly represents the relative prominence of feeling and cognition in the several senses, and give your reasons. Do you think it would be possible to develop the feeling or the cognitive element in any one of the senses until that element should become relatively more important than the others,

though usually it is least important, e.g., to make taste largely an intellectual sense? Give reasons.

Laying aside for the moment the question of the *relative* prominence of feeling and cognition, consider the question as to which sense is capable of producing the most pleasant or unpleasant sensations. Are there any colors as pleasant or unpleasant as are some sounds? Compare also the most pleasant and unpleasant odors, tastes, and skin sensations, and state which you think most intense. Compare now the different senses as to the number and frequency of pleasant and unpleasant



sensations experienced through them. Now make a generalization as to which sense is the most important source of pleasure to you (absolutely, not relative to the amount of knowledge it gives). In doing this you should confine yourself to the sensations themselves, not counting the ideas and feelings suggested by them. The combinations of sen-

sations may be counted; e.g., the feeling produced by two or more colors together, two or more notes in succession in which the effect is different from that where they are perceived separately.

Mental Images and Feeling.—From just as vivid a mental image as you can of the visual appearance of some object or color you like to look at. Now notice whether a feeling similar to the one experienced in looking at it arises. Is it as intense? Does it come as soon

as the mental image is formed, or not until it has been held before the mind for a while? Does it come best when you represent its appearance or when you ignore the appearance and try to represent the feeling it produced? Make the same observations upon mental images of things heard, touched, tasted, and smelled, which were either pleasant or unpleasant to you. Are we justified in making the generalization that all mental images arouse feelings similar to those experienced in the original sensations, but usually less intense?

Are there any places or objects that do not themselves produce either very pleasant or unpleasant sensations, yet when perceived or represented produce very pleasant or unpleasant feelings? Is it in any or all cases because of some pleasant or unpleasant experience or experiences that were incidentally associated with them? May we then say that mental images not only call up feelings that were elements of the original sensations, but also feelings that were experienced at the same or nearly the same time! Mention sounds, odors, tastes, colors, persons, objects, names, etc., that are present or unpleasant to you, not in themselves, but because of feelings that have sometimes been associated with them. Mention subjects of study that you like and others that you do not, and say whether the feeling you have toward them is in any considerable degree the result of association. If you think pleasant associations important in education, give, fully and specifically, reasons for your belief.

Feeling of Activity.—Not only do sensations and their reproduction in the form of mental images pro-

duce feelings, but our own activity is felt in all mental processes, and this is an important element in nearly all feeling. Recall your own experience and notice whether you have been in an almost or entirely passive state slightly affected by stimulations, yet not yourself active; and contrast that with times when you have been actively observing, imagining, or reasoning. Probably the feeling in every process is largely or wholly the result of movement of muscles and of attention. Sometimes the feeling is of effort and hindrance, sometimes of free movement and power. As seen in the study of pleasure and pain, moderate activity is in general pleasurable. In general, however, exercise and the expenditure of surplus energy is more pleasurable if the activity is directed in some way either *rhythmically*, as in some plays, or to the attainment of certain ends, as in work and study. Have you ever felt a thrill of pleasure after working long for some end, as the solution of a problem, when you finally succeeded? Do you find pleasure in the successful exercise of your powers of perception, memory, imagination, reasoning, etc., independent of the objects perceived, remembered, etc., and displeasure in unsuccessful effort? Illustrate fully from your own experience, and also from your observation of others, especially children. May we say that intellectual activity is its own reward because of the pleasure resulting from successful effort? If tasks were always suited to pupils' ability, so that effort would be necessary yet success always obtained, would any other stimulus to study be needed than that coming from successful activity?

Feelings and Intellectual Processes.—We have already seen that there are no purely intellectual processes, but that all are accompanied by feelings. We are now prepared to look for the source of those feelings. All mental processes require activity, and they cannot be carried on without sensations being received or mental images being found. These, as we have just seen, all produce feelings; hence we may analyze the various mental processes and find the sources of the feelings accompanying them. When you look at a nicely-frosted cake, what is the most important source of the feeling experienced—visual sensations, mental images of how it will taste, mental images of pleasant or unpleasant experience associated with cake, or the feeling of activity in being able to recognize it and judge of its quality? Analyze in a similar way the feelings accompanying the perception of roses, a maple-tree, a snake, a robin, a flag. Mention some things that are peculiarly agreeable or disagreeable to you, and state what is the principal source of the feeling.

Use your memory in recalling a very pleasant experience, also an unpleasant one, and state what the principal source of the feelings is. Use your memory in recalling some historical, mathematical, or geographical facts, and then determine the source of the feeling experienced in doing so.

Do you find pleasure in constructing mentally objects, persons, and scenes described to you or read about in books? Do you find pleasure in using your creative imagination? Is it greater or less than in the constructive? Which is the most important source in each case

—mental images or activity? Is there in some instances pleasure in using the imagination when the mental images used in construction or creation, or the images that result from those processes, call up unpleasant feelings, as in reading tragedy? Do you find much pleasure in contemplating the result of your imaginations? Edison is said to take pleasure only in the activity of inventing and constructing, and to have no further interest in a machine when it is perfected. Tennyson, on the other hand, took great pleasure in reading his own poems. If you have observed such differences in children or others, report it.

How much of the feeling aroused by each of the words brook, patriotism, spring, reptiles, lilies, is due to the sensation the sound of the word produces, how much to mental images belonging to the concept, and how much to those incidentally associated with it; also, how much to the activity of forming clear concepts of the classes named? Answer the same questions in regard to other words. Analyze also the feelings called up by names of common school subjects, also by the names of individuals. What is the most important source of the feeling produced by reading Poe's "Raven"?

Relation between Cognition and Feeling.—As already indicated, there is no feeling without some cognition and no cognition without some feeling; and now the question comes, Are they usually concerned with the same things, and do they increase together, or does one decrease when the other increases? Do you in general think most about those things you feel most about, and feel most about the things you think most about? Refer to your

past experience, and notice whether, when anything has strongly affected your feelings, as sorrow, anger, joy, you think much about it; also, whether you are apt to have considerable feeling in regard to things that have occupied your mind a great deal, as some plan you have been carrying out, or task you have been laboring to complete, even though you were not at first much interested in it? Do you generally attend to those things in which you are interested, and are you generally interested in some way in the things to which you attend? Do cognition and feeling increase in intensity together when concerned with the same objects, or one decrease as the other increases? Does your attention to subjects increase with your interest in them, and does your interest increase as you cognize them more clearly? Does the feeling of anger, fear, sympathy, joy, increase or decrease with increased clearness of perception or representation of the cause? As you become more angry or frightened or sympathetic, do you perceive more or less clearly cause for it? It is sometimes said that a man is "blind with rage." Is he blind to the cause of the anger, or only to everything but the cause? It is sometimes said that a man's feelings prevent his judging correctly. Is it because he cannot cognize clearly that which concerns his feelings, or because he cannot attend to and clearly perceive other things necessary to a correct judgment? It has sometimes been said that feeling and cognition are exclusive, one decreasing when the other increases; but it is probable that in most instances where this seems to be so they are really concerned with different things, and hence increase in one produces decrease

in the other—as is usually the case when attention is drawn from one thing to another.

Cognition and feeling continually exert a reciprocal influence upon each other. What attracts non-voluntary attention depends upon one's feelings using the word in its broadest sense—of sensitiveness. Even in earliest infancy some are more sensitive to sounds and others to color; and all through life some are more sensitive to one kind of impression than to others. Can you illustrate this? Does it not follow, then, that non-voluntary attention is primarily determined by feeling in a large measure, both as to things attended to and intensity of attention? Non-voluntary attention prepares the way for voluntary, arousing curiosity and desire; the thing is more closely observed, and the feeling of interest increases, producing additional attention till the end toward which effort is directed is gained. On the other hand, there can be no feeling about anything not cognized; and hence what feelings shall be aroused depends upon what things are brought to our cognition. Could one feel sympathy unless something suited for exciting it were presented to consciousness? Illustrate further how increased variety and clearness of knowledge may increase the number and intensity of feelings.

CHAPTER III.

EMOTIONS.

Nature and Varieties.—If a hard snowball strikes a boy in the face he experiences a feeling of pain, which is a purely sensory feeling. In addition to this, his face may flush, his breath come quick, his hands clinch, as the accompaniment of a feeling that is not sensory, but emotional. The sensations produced by these bodily changes, and the mental images perhaps of past evil treatment by the boy who threw the snowball, are important factors in producing the feeling, for the complex feeling known as anger is not the immediate result of the contact of the ball with his face. The feeling may arise wholly from within, as when one hears of a small boy being abused by a large one. The auditory sensations produced by the one telling have little or nothing to do with the feeling which is aroused by the ideas suggested by the words. All such complex feelings which result not from immediate sensory stimulations, but from ideas and induced bodily changes, are known as emotions. Give a number of illustrations showing the difference between a sensory feeling and an emotion. When an

emotional feeling is somewhat continuous it is more properly called a passion.

The variety of kind and degree of emotions that may be experienced is almost infinite, and the difficulty of classifying them correspondingly great. The following names indicate some of the most common emotions, and it will be a good exercise to spend a half-hour or more in trying to classify them, noticing what standards of classifications may be used and the impossibility of getting a good classification of all the emotions with any standard that is chosen: Embarrassment, horror, resentment, defiance, courage, sorrow, grief, suspense, anxiety, melancholy, expectation, hope, sympathy, reverence, pity, humor, respect, benevolence, admiration, esteem, patriotism, envy, scorn, remorse, jealousy, malevolence, novelty, contempt, monotony, doubt, surprise, belief, astonishment, reality, love of truth, curiosity, power, modesty, restraint, ambition, approbation of self, rivalry, humility, freedom, pride, feeling of relation.

Fear and Anger.—These are probably the most primitive of the emotions, often being clearly manifested by babes only a few months old. Mention any instances of their manifestation by very young children that you have noticed. Do you think much intellectual development is required in order to experience those emotions? Do sudden sights or sounds ever produce fear when there is no definite idea of danger aroused? Illustrate. Give instances from your own experience or observation when increased experience and knowledge causes certain things to be feared that were at first not frightful; also of things ceasing to call forth fear. Is fear of any value

in preserving the life and health of animals and men? Illustrate, and give reasons. May it ever be a means of moral self-preservation and development? Give reasons. Even if it is sometimes useful as a means, is it valuable as an end—a desirable feeling to cultivate? What bad effects, if any, may result?

Is the feeling of anger more closely related in origin to pleasure, or to pain? Illustrate. Is the feeling itself ever pleasurable? Is the feeling of any value as a means of self-preservation? Reasons. When excessive, does it ever injure the health? In general, what is the effect upon moral development? Will the feeling become stronger and more easily called forth if frequently excited? What is the effect upon children of teasing and making them angry, as is sometimes done by older people for amusement?

Love and Sympathy.—These feelings are manifested at quite an early age, but not as strongly in young children as are fear and anger. Some ideas of previous experiences are necessary to their existence, probably, even in their earliest manifestation, while such is not the case with fear and anger. The love of a very young child for a person is probably largely the result of mental images of pleasant sensations associated with that person. Illustrate the fact that with children a few years old any one who is the means of giving them pleasant sensations very quickly gains a place in their affection. Is it not true also that *we* are apt to love those who give us pleasure either sensory or emotional, and dislike those who produce in us unpleasant feelings? After the feeling is strongly developed, however, it becomes less selfish,

and may be felt for those who no longer give pleasure, unless it be the pleasure of serving the one loved. The memory of past pleasures, however, is an important element in continuing the feeling. Do you think love has any self-preservative value, either directly or indirectly? What would be the effect upon the continued existence and development of animals and men if no individual felt any regard or did anything for other individuals? Is the feeling a desirable one to develop for its own sake? Is it valuable as a means of moral development?

A young baby will sometimes reflect in its own features the smile of its mother. This is probably a sort of reflex imitation of what is seen, and at first only slightly if at all the sign of sympathy. No doubt such spontaneous imitation of the signs of feeling is an important means of developing the feeling of sympathy. The further conditions are mental images of feelings sympathized with, and some feeling of love for the person experiencing the feeling. Is it possible to sympathize with a feeling entirely different from any that we have experienced? Can you sympathize as perfectly with one of a different race as of your own? One of a different age? One of an entirely different disposition? Does a vivid representation of the condition of another increase the feeling of sympathy? Illustrate. Do you suppose people ever lack in sympathy because they lack in the power of imagination? or, having the power, because they do not think to use it in representing the condition of others?

Which is easier for you to sympathize with—joy or sorrow? Do you think avoiding envy and sympathiz-

ing with joy indicates a higher development of sympathy than does sympathy with sorrow only? Give reasons. Social feelings of various kinds are probably dependent in the main upon sympathy, though they may be largely selfish—the outgrowth simply of a desire to have certain feelings aroused within us by others.

Feelings of Self.—All feelings are in their very nature self feelings, being, as we have already seen, modifications of self; but there are some that are concerned more exclusively with self—have but little reference to other things and persons. After the bodily sensations, which are wholly egoistic, the most prominent of these are the feeling of power, and growing out of that on the one hand ambition and pride, and on the other modesty and humility, also courage and fear, all of which are concerned principally with self. These feelings are prominent elements in the feeling of self, and are the basis for the development of most of the other emotions.

The feeling of self, the consciousness of our own existence as a personality distinct from all external things and all other persons, is a gradual development usually, though some persons can remember the time when the idea first came clearly to them, and they thought of themselves as an existence distinct from the world around them. Even in those cases, however, they had probably already made the distinction, though they had not made it a special object of thought. The general bodily sensations are the basis of the feeling, which could probably never develop into distinct knowledge without movement, through which the child learns his power to change his own sensations and the things that

affect him. All ideas gained through the special senses being associated with these general sensations and feelings of movement, are, in a way, a part of one's self, Hence Prof. James has good ground for saying that one's self is all that he can call his, including his property, friends, reputation, and intellectual acquirements. As these increase one's self seems to grow, and the loss of any of them seems to diminish one's personality. He gives the formula "Self-esteem = $\frac{\text{Success}}{\text{Pretensions}}$," and shows how this is true for each individual in different lines of his activity. Can you illustrate this? To make it absolutely correct, we perhaps need to add to it "compared with his *ideal* of what ought to be done," though "pretensions" taken in a sufficiently broad sense might include the person's ideal.

Is self-esteem a good basis for the development of a strong character? Which could you hope to influence most—a boy with considerable self-esteem, or one with none? Illustrate the effect of the opinions of parents, teachers, and friends upon the value one places upon himself. Does experience help one to value himself correctly? Are tests in school subjects and in games of value in this respect?

Self-consciousness.—Turning one's thoughts within and observing introspectively one's own mental processes may be almost purely an intellectual act; but if at the same time we think of others as observing us and compare our mental operations with some standard of what they ought to be, there is a distinct feeling aroused, and we are then self-conscious. This self-consciousness may

be temporary, as in embarrassment or triumph, or more continuous, as in bashful and egotistical persons who think of themselves a large proportion of the time.

Children who are noticed a great deal by others are apt to have their own attention directed to self, and hence to become self-conscious. Mention any instances of this kind you have observed. Have you ever noticed instances of children silent and embarrassed when spoken to by a stranger about themselves, but responsive and free when spoken to about other persons or objects in which they were interested? In general, is it well to arouse and to develop self-consciousness in a child? Why?

In older persons may the direction of attention to one's activities be a means of becoming better acquainted with the peculiarities of those activities, so as to make them more like the standard with which they are compared? Is continuous self-introspection and self-consciousness a good thing, or does it tend to prevent successful activity, and to foster undue pride, humility, or self-seeking?

Æsthetic Feelings.—The feeling that arises upon the perception of beauty is peculiar in that it seems to have no purpose beyond the pleasure of the feeling itself. All pleasurable sensations have in them one element of the æsthetic, and in young children this is about all the element that is present. Another element is the harmonious combination and arrangement of sensations. The various forms, colors, and sounds give æsthetic pleasure according to the harmony with which they are arranged. In the more advanced stage of de-

velopment of the æsthetical perceptions not only must the parts immediately together harmonize, but there must be a variety in the parts, and all together must constitute a unity. This highest form of æsthetic feeling may arise from the perception of harmony and unity in a literary or scientific essay, or in contemplating the laws of nature, as well as in perceiving the variety and unity in the form and color of a picture or a building, or of pitch, quality, time, and loudness of sounds in music.

There is a fourth source of the æsthetic feeling—the feeling aroused by the mental images suggested by what is perceived. The beauty of a picture or statue does not usually consist wholly or even mainly in the arrangement of form and color harmoniously into a unity, for the thought which the picture or statue expresses or suggests is one of the most important sources of the feeling produced, especially if it suggests something more agreeable than can be perceived at any one time, or in other words, suggests the ideally perfect. It is evident that only one who has had the requisite experience can feel that which is suggestive in a work of art, and also that considerable intellectual development is necessary to the perception of unity where the variety is great; hence children cannot be expected to appreciate works of art which require much experience or intellectual development.

The fact that objects that give æsthetic pleasure in childhood often cease to do so in later years suggests another source of the æsthetic feeling, i.e., mental activity. If the complexity of the parts is so slight that

the perception of unity does not require sufficient mental activity, the object gives little or no pleasure. If the parts do not give sufficient variety the object becomes dull or monotonous for the same reason and because of fatigue of the parts concerned in the perception, while if they are too various there is a feeling of strain and baffled effort. With so many sources of feeling, varying with inherited tendencies, experience, education, and mood, it is not strange that the tastes of different individuals differ so much, and that those of the same individual differ at different ages.

The indefinite quality known as culture is simply a development of the æsthetic nature emotionally and intellectually, so that the individual has a keen and just appreciation of harmony and fitness, not only of objects, sounds, form, and color, but of words, ideas, and actions, in all the relations of life. For this reason, and because of the pleasurable character of the feeling itself and its close relation to morals, it is very important that the æsthetic feeling should be developed, and beauty in nature, art, and literature may all be used for this purpose. Many objects suited to arouse the æsthetic feeling in the child must be presented to him, and his attention given in such a way that he perceives and feels their beauty. Beautiful objects alone are not enough, but they must be suited to his powers and his attention must be directed to them. This is done most effectively and the feeling most surely aroused when those around the child notice the beautiful and give expression to the feeling. Indicate specifically some of

the ways in which the æsthetic feeling may be cultivated in the schoolroom.

Intellectual Feelings.—There are feelings accompanying intellectual operations arising mainly from the relations of ideas in the mind and largely independent of the character of the ideas; hence they may be called intellectual feelings. That feeling which enables us to distinguish between mental states corresponding to realities and those that are imaginative may be called *feeling of reality*. If there is uncertainty as to the reality of the experience there arises a feeling of *doubt*, and when one is convinced by evidence of the reality, a feeling of *belief*. There are also feelings accompanying, sometimes preceding, the perception of likeness, difference, similarity, relation, etc. The repetition of any mental experience produces a feeling of *monotony*, and any new experience a feeling of *novelty*, and this usually arouses a feeling of *curiosity*; and if it is not only new, but contradictory to past experience or opposed to the present feeling of *expectation*, it produces *surprise* or *astonishment*. Curiosity leads to a feeling of *interest*, which prompts to activity to connect this new mental experience with other experiences.

Interest, therefore, is the most important of the intellectual feelings, for it both prompts to intellectual activity and constitutes the principal pleasure of the activity. The feeling is the result partially of the new experience which always produces feeling, partially of the activity which, as we have already seen, is in general pleasurable, but mainly from the relation of ideas to each other especially new and old ideas. All perceiving of

relations is interesting; hence, as previously discovered, in order that there may be attention and interest the subject must be neither entirely new nor entirely old to the one studying it but be such that the relation of the new ideas to old ones are perceived or new relations between old ideas discovered. Herbart's theory of apperception and interest is founded upon this. The feeling that arises from new experiences he calls *empirical* interest; that resulting from the perception of relations, *speculative* interest; and that resulting from the perception of the harmony and unity of a number of diverse ideas, æsthetic interest. These feelings often experienced produce *love of truth*.

Moral and Religious Feelings.—All feelings connected with ideas of duty are moral feelings. Ideas of duty involve the conception of several courses of action, a judgment in regard to them, and a feeling of obligation to perform the action approved by the judgment. The feeling that certain acts *ought* to be performed rather than others is the essential element in all feelings that may be classed as moral. The thought of a single action without reference to its effect cannot give rise to a moral feeling, for it is a moral action only when considered with reference to its results, directly or indirectly, upon others. The time that you go to bed is morally indifferent, unless it affects others directly by disturbing them in some way, or indirectly by interfering with your health, disposition, or power to do. Give other illustrations of actions that are and are not moral.

From the fact that actions derive their moral quality from their relation to other acts, they are closely related,

on the one hand, to prudential or useful acts, which are so because of their results. Prudential acts, however, do not necessarily involve any thought of the results upon any one but ourselves, nor any feeling of obligation. If such thoughts and feelings come in, they become moral as well as prudential. On the other hand, the moral feelings are closely related to the æsthetic, for the æsthetic feelings arise largely from the contemplation of the relations and the thought of an ideal, while the moral feeling arises from a contemplation of actions and the thought of the ideal action. They differ, however, in that the moral feelings are concerned only with actions, and in that the feeling is not merely of approval of an ideal, but of obligation to conform to it.

Feelings have a moral quality because they prompt to moral actions. No feeling is in itself moral, but only as it is a part of an action and is related to other action. Love is more frequently a moral feeling than hate, because it prompts to actions that do not injure but help others. All feelings that are concerned mainly with self tend to make one think only of the acts whose results are favorable to self, and tend to stimulate one to such actions; hence egoistic feelings in excess produce immoral actions. Sympathy, and similar feelings concerned mainly with others, on the contrary, prompt to actions resulting favorably to others; hence, if not carried to an extreme so as to decrease one's power of action, they are favorable to moral action. The self feelings are morally wrong only in so far as they are excessive and cause actions to be performed regardless of results upon others, and the sympathetic feelings are

morally right only in so far as they lead to actions that harmonize the results upon others and upon self. The selfish feelings are more instinctive and naturally stronger; hence moral training is directed more to the development of the sympathetic feelings and repression of the selfish so that a proper equilibrium may be established.

Moral development results, then, through the arousal of unselfish feelings, the formation of ideals of right action, and increase in the feeling of obligation to conform to the ideal of right action. Any experience or teaching that tends to develop a child in any of these three ways is valuable morally. It is only by experience of feelings that he is able to sympathize with the feelings of others, and largely by experience that he learns the effect of his actions upon himself and upon others; hence experience is the basis and the most important factor in moral development. If the attention of the child is called to the results of action, the formation of an idea of the results of various actions will be hastened. The observation of noble actions and of regard for the right, either directly in those surrounding the child, or indirectly through the medium of oral or printed story or history, is a most important means of developing an ideal of what is right and a desire to do it. Rules, maxims, commands, are also helpful in forming ideas of right action. Yet without the knowledge of the results of obedience or disobedience no feeling is aroused, and the ideas fail to become ideals.

Religious feelings are closely related to moral feelings; the difference is that instead of being aroused

by ideas of our relations to other persons, they are the accompaniment of ideas of our relation to some being higher than man. Generally speaking, the ideas and feelings concerned with our relations to others are the basis of religious ideas and feelings. On the other hand, the moral feelings are in most religions intensified by the religious ideas and feelings.

Desires.—Desires are distinguished from other feelings by the fact that they arise not so much from present experiences as from a representation of possible experiences more agreeable than the present, and by the fact that they involve to a greater extent a tendency to activity. Any feeling may give rise to a desire, hence the number and varieties of desires are as great as the number and kinds of feelings. The greater the variety of interests one has the greater the number of desires, and the greater the number and intensity of desires the greater the variety and vigor of will activity; hence wealth of desire is favorable to richness of character.

Classification of Emotions.—The classification of emotions in a satisfactory way has thus far proved an impossibility because of their great variety and the fact that those which are similar in one respect are entirely different in other respects. The classification followed in this chapter may be outlined as follows:

I. Primitive Emotions: Fear, anger, etc.

II. Developed Emotions:

(a) Love, hate, etc.

(b) Æsthetic Emotions.

(c) Moral and Religious Emotions.

(d) Intellectual Emotions.

III. Self and Self Feelings.

IV. Desires.

The following grouping of the principal emotions, if carefully studied, will be found more suggestive and valuable than any rigid classification that can be given. The words suggesting the most typical emotions not contrasted are printed in small capitals, the typical contrasting emotions in bold-faced type, and the varieties and degrees in ordinary type. In a general way, those toward the top of the page are pleasurable and those toward the bottom painful. It will be a valuable exercise to notice the gradations of emotions and the connection between the different groups.

PLEASURE

Joy

Satisfaction
Contentment

Trust
Hope
Faith

Courage

Egotism
Pride
Rivalry
Ambition
Freedom
Power

Humor

Amusing
Ludicrous
Ridiculous

Derision
Sarcasm

Scorn

Contempt
Defiance

Distrust
Suspicion

Fear

Horror
Despair

Resentment
Malevolence
Revenge

Self-Approval

Obedience

Duty.

Love

Sympathy
Pity
Patriotism
Benevolence
Generosity
Admiration

Gratitude
Esteem
Reverence
Respect
Indifference
Forbearance

Remorse

Sadness

Melancholy

Sorrow

PAIN

Love of truth

Interest

Curiosity

Wonder

Novelty

Surprise

REALITY.

Belief

Monotony

Doubt

Perplexity

Anxiety

Unity

Harmony

Relation

BEAUTY.

Difference

Discord

Confusion

Hate

1. The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations

$$\begin{aligned} & \frac{dx}{dt} = A(x)y + B(x) \\ & \frac{dy}{dt} = C(x)y + D(x) \end{aligned} \quad (1)$$

where $A(x)$, $B(x)$, $C(x)$, $D(x)$ are matrices and x is a vector. The second part of the paper is devoted to a detailed study of the case when the matrices $A(x)$ and $C(x)$ are constant.

2.

The third part of the paper is devoted to a study of the case when the matrices $A(x)$ and $C(x)$ are functions of x .

The fourth part of the paper is devoted to a study of the case when the matrices $A(x)$ and $C(x)$ are functions of x and t .

The fifth part of the paper is devoted to a study of the case when the matrices $A(x)$ and $C(x)$ are functions of x and t and the system of equations (1) is nonautonomous.

PART III.

Will.

CHAPTER I.

CONTROL OF MENTAL AND MOTOR ACTIVITIES.

Nature and Functions of Will.—Is there ever a time when you are conscious and yet not exercising your cognitive powers in some degree? Is feeling in some degree always an element in your consciousness? Are you ever conscious and yet not using your will in the slightest degree? In answering these questions recall your past experiences; also spend some time in observing introspectively your own mental operations, trying to note when will is an element of the consciousness and when it is not. Would you say that there is always activity when there is volition? Is this activity always visible bodily movement? Is there always activity of attention in volition? Now reverse the question: Is there always volition when there is activity? Notice the various movements and changes of attention you make,

and observe when they are volitional and when they are not. Probably you will note various movements of the eyes, head, and perhaps other parts of the body, and attention to sounds or objects that you did not think of turning toward or attending to before doing so, while in other instances you thought more or less clearly of the result of the turning toward before making the change. Thus there comes to my ears the sound of a voice producing an intensification of consciousness upon that sensation and a barely perceptible turning of the head in the direction of its source; the sound is repeated with the same result; then a third repetition suggests the question, "What is the man saying to the boy"? and there is a conscious pausing and attending to get an answer to that question. Would you say that there was any volition in the first two instances? Was there in the last? Mention similar instances in your own experience, and state in which ones there was some consciousness of the end, purpose, or result of the activity.

Would you say, then, that will is present in consciousness only when there is activity, and when the end or result of the activity is more or less clearly represented? Is it always present under those circumstances, or may there be an end of activity represented and the activity not be toward that end? If you represent as the end of your activity the solution of a problem, but your activity is toward the formation of a mental image of how you will look in your new clothes at a party to-night, is will an element in that activity? If the representation of the end, (solution of problem,) results in decreasing the activity of the imagination, should you say

that will is present in consciousness? Is will, then, present when the activity is modified toward the attainment of a represented end, or more briefly, in some degree directed toward the represented end?

Is the end represented usually in some degree desired—preferred to any other? Would you say as some do that the activity is not volition unless the end is desired? State in a single sentence the characteristics that distinguish a volitional state of consciousness from one that is not volitional.

In which kind of attention is there activity, but no represented end? In which kind both, but activity not toward the represented end?

Notice whenever there is movement of any kind in volition that the result is some change in the relation of external things to us, or of ourselves to external things. Mention some instances specifically in which this is true. Is there not also in such cases a change in our consciousness produced by the change in the relation of things with reference to us? When there is no visible movement but only direction of attention toward the represented end is there not also a change in consciousness? Notice your own consciousness at the beginning of some volitional activity of observation, imagination, or reasoning and at the close and see if your consciousness has not changed. May we say that all volitional activity produces a change in consciousness? Is this true of other activity? In the latter case is that the purpose of the activity? In volitional activity may we say that the ultimate purpose of the volition is to produce a change in consciousness? Illustrate.

From previous study we know that there are very many kinds of activities. Every stimulation of the sense organs (and the eye, ear, and skin are being stimulated all of the time) tends to excite activity. Every mental image or concept excites the mind to call up and combine in various ways other images and concepts. Every feeling produces movements and tends to excite intellectual activity of various kinds. One kind of activity would result in one change in consciousness and the others in different changes. If there were no controlling power there would be no unity of action, but only a seething commotion and overflow of thoughts and feelings, producing diversity of movement and change of consciousness. Only when these various activities are controlled and directed to the attainment of definite ends do the activities become the actions of a self-directing person. That power of the mind which directs and controls these various activities to the attainment of conceived and desired ends is known as the will. Until a child develops this power he has no will, however, active he may be. Notice how the will acts with reference to the future. Illustrate how it determines what shall come into consciousness.

All animals including human beings make spontaneous movements — movements independent of external stimulation—from birth and even in the embryo. These movements when directed may be said to be willed movements *par excellence*; hence does it not seem that will performs the functions of exciting activity as well as directing activity already begun. Does it also increase activity already begun? May it also decrease or prevent

activity? Illustrate these latter points, and sum up in a sentence the functions of will.

CONTROL OF INTELLECTUAL ACTIVITIES.

Observe your own intellectual activities of various kinds and notice to what extent they are controlled by the will. Report, for instance, the various stimulations of the senses that tend to attract your activities to them, and the extent to which you direct your activities to certain points to find out certain things in common instances of active perception, as, when looking at a book or article of clothing you are thinking of buying, looking at a plant or animal you wish to classify, listening to sounds you wish to identify, or observing a person or building that you wish to describe. Analyze several such instances, indicating specifically the various stimuli you refrain from attending to, and the direction of your activity to the attainment of definite ends. Mention also any individual differences in the power to do this you have observed in others.

Listen to a short description of some kind, and notice how your will limits and directs your activities in constructing the mental images in accordance with the description instead of following other lines of association or attending to the various things stimulating the senses. Again, try to construct a quilt or wall-paper pattern of equilateral triangles of two sizes or to write a brief imaginary story. Notice in each case how you continually check yourself and keep your activity directed toward the attainment of the end set before you.

Notice when you are trying to recall a certain name

or fact how you direct your attention to things associated with it, and prevent yourself from running off on other lines of association.

Notice when following a demonstration in geometry or the arguments of a speech how you continually direct your activities along certain definite, narrow channels. Notice in every lesson how your will is continually directing your activities to the accomplishment of represented ends.

Notice more definitely just *how* the will directs the intellectual operations. Does it act directly upon what is not in consciousness, or only indirectly through what is in consciousness? Can the will do anything more in controlling thought than to fix attention upon ideas in consciousness that seem to be associated with the one desired?

Efficiency of Will.—Often in exercising our wills we have a feeling of effort sometimes very strong. Does the feeling of great effort necessarily indicate efficient activity of the will? Does excitation or great increase of activity indicate an efficient will? or is efficiency of will measured by the extent to which the activity, whether little or much, is directed to the attainment of the represented end and independent of the amount of effort used? Illustrate and give reasons for your answers, then sum up in a sentence the general truth in regard to the efficiency of will.

CONTROL OF FEELINGS.

If you are suffering from bodily pain of any kind, what is the effect of keeping the attention fixed upon

the cause of the pain? What is the effect of keeping the mind fully occupied with things not connected with the pain? Designating by the term "object" of feeling that with which the feeling is associated, whether it be a material object or an idea, what is the effect of fixing the attention upon the object of an emotion, as anger? What is the effect of turning the attention to other things? Is it possible for the will to act *directly* upon a feeling of any kind and increase or decrease it? Can you prevent or produce the signs of a feeling? What is the usual effect of doing so? Can you direct the attention to one or another object of feeling and thus indirectly increase or decrease any emotion? Give several instances in which you have thus indirectly modified your feelings. Show how one might increase or decrease his feeling of anger, fear, sorrow, or sympathy under circumstances tending to call forth those emotions, respectively, in a strong degree. May we not say that *if* one had complete control of his attention that he could have complete control of his feelings, and feel as he wished at any time? The feelings, however, are powerful stimuli to attention; hence the "if" may be infinitely large.

Indicate how love for a subject of study, for one's country, or for a person may be increased or decreased by the will. Can the love of beauty, of truth, and of justice be increased by directing the activities to objects suited to call forth those feelings? Illustrate. Could a permanent change in feeling and hence of disposition be brought about by the continued voluntary direction of the will to the object tending to produce the feeling?


Indicate specifically how one could voluntarily make his disposition more cheerful or more sympathetic. Can young children be expected to voluntarily direct their attention so as to excite a certain feeling which others wish them to have? For instance, is it any use to tell a child that he ought to be interested in a certain subject or like a certain person? If the teacher wants a pupil to experience such a feeling, what must he do?

CONTROL OF MOVEMENTS.

How Voluntary Motions are Made.—As already suggested, the greater number of volitions are expressed sooner or later in a movement of some kind. The idea is changed into a reality by muscular contraction, that is, the representation is changed into a presentation. Few if any of the ends that we strive for can be obtained without movement of hand, eye, vocal organs, or the whole body. The question to be considered now is how these movements are controlled by the will.

In writing your name how do you control the movements of your arm so as to make the letters? From physiology we know that when you write your name nervous impulses must pass out from the cortex of your brain down to the spinal cord, then from it along certain nerve fibres to the muscles of the arm so that the muscles are made to contract and relax just enough to produce the desired movements of the hand and each movement at just the right time. Do you know the nerves and muscles concerned in making each letter, and the exact path the nervous impulse must take in passing

from the brain to the arm? If not, is it not evident that your will has no direct control over the physiological process of movement? Let us then turn our attention to the psychical process involved in movement. Look

at this figure ; then with eyes closed try to

draw it, noticing what mental images, if any, you have in mind as you do so, and also what sensations you receive by which you can form some idea of the correctness of the movements. Is it a visual image of the figure and of the movement of the arm through space that you have while making the figure? Is it the motor sensations that enable you to know that the movement is being made and to judge of its accuracy? If your eyes are open while you are making the movement do you depend upon the muscular sensations for judging of the accuracy of the movement or upon the visual? If you try to move your feet in a certain way can you tell whether you make the movement correctly or not by the motor sensations or do you need to look at them? Close your eyes and have some one guide your hand so as to make a simple figure of some kind, then with eyes still closed try to make the same figure and to judge of the success of your attempt. What sensation do you have to depend upon for getting knowledge of the shape of the figure? Do you from those sensations form an image of the motor sensations to be obtained in making the figure or the image of the visual sensations you would get in watching the movement or both? In making the figure which image is most prominent in your mind? Can you readily translate motor sensations into a visual image of the

movement, and the visual appearance into a motor image of the movement ?

Try pronouncing some difficult words or sounding some notes, and notice what mental images you have in mind as you do so. Is the image visual, motor, or auditory largely ? How do you judge of the accuracy, by the auditory or the motor sensations that you get as you utter the sounds ?

It seems then, looking at movement from the psychical side, that there are mental images preceding and accompanying the movement and sensations accompanying and following the movement, and that the accuracy of the movement is judged by comparing these two. Is there anything else involved in movement on the psychical side ? If not, we are to think of the physiological process as carried on without conscious direction by the nervous and muscular apparatus, the course of the nervous impulse being determined on the psychical side by the kind of mental image formed, just as the note sounded by an organ is determined by the key struck. The musician needs not to know the mechanism by which the note is sounded, so the mind needs not to know the mechanism by which a motion is made.

When the key middle *C* on the piano is struck that note will be sounded whether the key was struck accidentally or intentionally. If the nervous and muscular mechanism is like the musical instrument we should expect that when a mental image of a motion is formed the movement will be made whether the individual intends it or not. Have you ever written a word some one spoke in your presence instead of the one you in-


tended to write? Was it because you unintentionally, at the moment found a mental image of the word? Have you ever spoken words you did not intend to in a similar way? In the game at the words "Thumbs up," why is it that your thumbs go up when neither you nor "Simon says" for them to? Give other illustrations of unintentional movements produced by mental images of movement.

If our observation and reasoning thus far is correct it would seem that psychically control of movement means simply control of mental images. The will can decide what mental image shall be held in mind, and thus determine what motion shall be made, the nervous and muscular mechanism always, when in a normal condition, acting in conformity to the mental image formed, and that these mental images may be either visual, motor, or auditory.

With most persons the visual images are the most prominent in moving the limbs and the auditory in moving the vocal organs, but with some the motor images are most prominent in all movements, and with all persons probably the motor sensations are an important element in forming images of movement of all kinds.

Learning New Motions.—If controlling movements is simply controlling the mental images suited for calling them forth, then to learn a new motion one must learn what mental image is suited for calling it forth. This can be learned only by experience—just as a beginner must learn by experiment what note will be sounded when a certain key of a piano is struck. When a motion has once been made, then usually a mental image of the

sensations experienced in making it will produce it again. Have you never, in learning to write, draw, or skate, or the movements necessary in any kind of work, after several trials more or less unsuccessful, finally succeeded in making the movements once just right, so as to make you think "Now I have it"? Perhaps, however, the next attempt is unsuccessful; then you try to think just how the successful movement felt, and what you had in mind when you made it. The more perfectly you succeed in doing this the more successful is your next attempt. When you get so you can form a perfectly distinct mental image of the movement and of its parts you can make it accurately. While this psychological process of forming a distinct mental image has been going on, the physiological process of the nervous impulses taking more and more definite courses has been occurring.

After one has had a great deal of experience in making movements he knows beforehand approximately what mental image will produce the new movement, and only a few trials are necessary to form just the right mental image. Perhaps you have never made a figure like this: ; but from former experience

in making curves and straight lines you can form a fairly distinct image of the movements required to make it. In fact, the relation between the visual image and the movement is so close that the translation of the image of the figure into the image of the motions required to make it is little more than the formation of the visual image of the successive parts as one after the other is

made. Is it not true if you can hold accurately in mind the successive parts of this figure that you can make it accurately? In writing or drawing is it not true that the more accurate your mental image of the letter or figure is, and the more perfectly you can hold the successive parts in mind, the more perfectly you can make it? Notice, as bearing on what is meant by control of a mental image, that if your attention goes in advance of the hand so that you are looking at a down curve when making an upward stroke, you do not make the figures perfectly. Is not, then, the improvement in writing and drawing a child makes an exact measure of improvement in his mental image of the object or letter, and in the power to hold the attention to the successive parts as they are made? May we not then look upon learning to draw as a means of training to form accurate mental images of objects, and to control them, and that the knowledge and power thus gained constitutes the real culture value of the subject to the pupil? The lines, then, that he makes in controlling these images are merely an important means of expressing his ideas. The motor sensations experienced in making the lines are, however, valuable as well as the visual in forming the mental images. To the teacher the figures drawn are an objective means of observing and testing the progress of pupils in the formation and control of mental images.

State which is lacking in the two following instances (supposing them possible)—perfect mental image or power of control of the mental image: (1) When the figure can be made perfectly, with a copy to look at, but

not otherwise. (2) When, without a model to look at, accurate judgment can be made as to the correctness of the drawings or letters shown, but the individual himself is unable to draw them with any accuracy.

In the latter case is it not true that if a person, besides recognizing that the letter or figure as a whole is accurate or inaccurate, can point out the part that is defective, that he can also usually make the letter or figure himself? If he cannot, it is then perhaps fair to infer that his defect is not in the correctness of the mental image as a whole nor of its parts, but either in the power of controlling the mental images or in the physiological apparatus.

Theoretically it is conceivable that one might have perfect mental images and have perfect control of them, but not be able to draw or write well because of a defect in the motor apparatus—just as a musician may strike the right keys in just the right order and time, but not make good music, because the instrument is defective. The drawer—the former of mental images and the maker of movements—is one agent, not two, as in the case of the musician and the piano; hence it may be doubted whether the power to form mental images can be gained without the power of movement or the power of movement without the power to form mental images of the movement. It is possible that the mental image-forming apparatus and the movement-making apparatus are not equally perfect in the same individual, but it cannot be admitted without evidence.

In the absence of evidence to the contrary, it is best to assume that not only are the drawings one makes an

accurate measure of one's progress in image forming and controlling, but also that the drawings of any two individuals are accurate measures of their relative powers in forming and controlling mental images. The statement that the one who draws poorly has just as good a mental image as the other, should not be admitted without good evidence in support of it, for the presumption is against it even more strongly than against the statement that "I know (certain truths) but cannot tell them," for language is an artificial means of expression, and movement a natural means. In either case a system of education which ignores or represses expression may lead to a condition in which the thoughts and mental images are more perfect than the expressions of them would indicate.

One's writing or drawing may not be equal to the mental images that he *can* form, but there is reason to believe that they are as perfect as the mental images he *does* form as he writes or draws. Report facts from your own experience and observation bearing on this question. The above discussion refers to plane figures not in perspective and some slight modification of the statement would be needed for solids. The evenness of the lines is also not referred to but only the form of the figure drawn, since steadiness of hand is largely physiological.

In controlling the vocal organs the auditory images usually play the same part that the visual images do in the control of the limbs, hence learning to utter a new sound means that one must learn to form and control an auditory image of the sound. Frequent hearing of a word is

then an important means of learning to speak it. Young children often form a great many mental images of words before they begin to speak; then after they begin talking seem to learn with astonishing rapidity, and sometimes utter new words perfectly the first attempt. The explanation is, that they have done the greater part of the learning before they begin to speak. If a child heard only a foreign language during the first two years of his life he would not make the usual astonishing progress in his native tongue the third year. The sounds a child hears as well as those he makes are then important factors in forming habits of pronunciation.

Defective hearing may be the cause of defective articulation as well as defective vocal organs. Those who lose entirely the power of hearing usually cease speaking, unless special effort is made to induce them to continue speaking. Persons born deaf may, however, be taught to speak. What mental images and sensations do they have to use in making the movements and judging of their accuracy? Helen Keller, who is both blind and deaf, learned to speak by placing her fingers on her teacher's lips and throat and then imitating the movements thus perceived. What mental images and sensations does she depend upon?

Making Familiar Motions.—Try to make a new sound, then pronounce some word that is perfectly familiar, and notice the difference. In the former case are you not distinctly conscious of holding in mind an auditory mental image and of an effort to make the movements of the vocal organs correspond to it, while in the latter case you think the word and it is uttered

with little consciousness on your part of auditory image and movement of vocal organs. Again, you sit with pen in hand, intending to express your ideas on a certain subject: as you think of them your hand writes the words while you are scarcely conscious of the movements made or of the mental images controlling them, but only of your intention to express your thoughts in certain words. Contrast that with your first experience in trying to make those letters and words. Notice also in games and occupations that are more familiar to you, how you go through the operation with little thought of the movements you are making, perhaps performing less perfectly if you notice just how you make every motion. That is, after a movement or series of movements have been made a great many times with a purpose, the thought of the purpose, or the thing to be done, is sufficient to call forth the necessary motion or motions. Can you say one has really learned to write, talk, draw, sing, or walk until he can do so at the thought of the thing to be done without attention to the motions involved?

Learning to Write, Draw, etc.—Learning to write means learning to make a series of movements for a purpose; and, as already suggested, it is not learned till it can be done with little consciousness of anything except the purpose to write certain words. There is involved, then, in learning to write, three things: (1) learning the simple movements that compose the series, (2) combining these simple motions in a series, (3) association with the purpose or thought. The distinction between the first two may be made clear by writing your name as you ordi-

narily write it, then one element (right curve, straight line, etc.) at a time; and between the second two by noticing the difference between the writing of a pupil in his copy-book and his writing in an essay or answer to a question asked him. There is no question that these three things must be learned, but the method of learning may be that of learning all at once, one at a time or a modified form of one of these methods.

It sounds reasonable to say that the pupil should first learn the comparatively simple elements of the letters, then learn to combine them so as to make letters and words, then learn to write the words in expressing thought. Your own experience in writing your name all at once and by elements, however, probably showed you that the movements are quite different, so that learning to make the elements would be only a slight help in learning to write words. This method of learning to write corresponds to the alphabetical method of learning to read, and, like it, ignores the fact that children see things as wholes before they analyze them. Since the movements of writing are dependent upon the mental images gained through perception, the order of perception should be followed in learning to write, and children should never be expected to advance faster in writing than in the perception of form. Another objection to this method is that, in practice at least, if it is not a necessary result of the method, the last step of associating the series of movements with the thought or purpose has been imperfectly made, so that the copy-book handwriting is not used at all in daily life, but a very much modified or entirely different style of writing,

The opposite method is to begin writing at first for the purpose of expressing thought with the pen or pencil instead of the lips. This seems like commencing a pretty complex thing at first, but it is just the way in which a child learns oral language and the way in which he learns to move his limbs to obtain the various things he desires. Is it any more stimulating and interesting way of learning? If one learns in that way will there be any danger that he will not be able to write as he thinks without attending to his movements? In this and in fact in all methods of learning to write two principles must be kept in mind: (1) the movements can never go ahead of the power of perceiving form, (2) every time a letter is made in a certain way the tendency to make it in that way is increased; hence a pupil should not be expected to make letters perfectly at first, but he should be expected to continually improve until he makes them sufficiently well. In using this method there is no objection to calling attention to the form of letters or to practising certain movements, providing the thought is constantly kept prominent that the writing is only a means of expressing thought. If this is not done we abandon what may be called the thought method of learning to write.

What has been said about the different methods of learning to write applies to drawing and manual occupations of all kinds. In the thought method of learning drawing it is used from the first simply as a means of expressing ideas of form. In the manual occupations the apprentice carpenter who begins working under the master learns to move the saw, hammer, and plane in

various ways as a means to the accomplishments of certain ends, and hence learns by the thought method. The student, however, who learns by some systems of manual training, practises the various movements of sawing, driving, etc., before attempting to make anything, and is therefore using the synthetic and mechanical method first described. Be prepared to give some of the advantages and disadvantages of these two methods and of the various modifications of them that may be used.

Kinds of Movements.—There are two principal types of movement in persons and animals in all stages of development, including the embryological stage. The first is the reflex type, in which the movement is the result of an external stimulus of some kind. The second is the spontaneous or impulsive type, in which there is no discoverable external stimulus, but the movement seems to be the result of changes taking place within the organism itself. Movements are classified according to the relative prominence of the external or internal factor, their purpose, and the degree of consciousness accompanying them.

Reflex movements proper are the simplest movements of the first type. They are simple movements made in response to a single stimulus, usually the same for the same stimulus, not necessarily purposeful and not controlled by consciousness. Examples: jerking hand away when the finger is pricked, winking when an object approaches the eye, etc. They are called forth by a sensory stimulus of some kind.

Instinctive movements belong to the reflex type, yet

vary considerably with changes in internal conditions resulting from variations in nutrition, time of day, season of the year, etc. They are much more complex than the reflex, and more purposeful, though the purpose is not necessarily known to the person or animal making the motion. Like the simple reflex movements, they are produced by nerve-centres naturally adapted for making them, so that they are made without experience or practice, and are made by all animals of the species. The movements of walking, flying, taking food, etc., performed by many animals with considerable accuracy at birth, are of this type, as are also movements of pursuing prey, escaping danger, building nests, etc. These movements may be called forth by mental images, as are the voluntary, but are usually called forth by percepts or complex sensations.

Impulsive movements proper are irregular, purposeless movements originating from within, usually perhaps because of an accumulation of nervous energy to such a degree that it tends to flow out to the muscles even when there is little or no stimulus to excite movement. The movements often noticed in young children and animals especially after eating and sleeping are of this kind. There may or may not be a state of consciousness calling them forth.

Expressive movements also originate largely from within, but instead of being irregular and indicative only of overflowing energy, they are quite definite for each bodily and mental state of which they are an indication. All of the natural signs of emotion previously discussed are of this type. These are called forth by a

feeling, and the cognitive element is often not very prominent.

Automatic movements are movements made over and over, or a series of movements that are made without the direction of consciousness. They may be inherited, as are the movements of heart, lungs, and intestines; or acquired, as are the movements of walking and frequently writing, handling tools, etc. It is doubtful to which type of movements they belong, but there is no doubt that they are at least partially dependent upon afferent impulses coming from the parts being moved. These impulses are produced by the movement of the voluntary muscles in acquired automatic movements and by the stimulation of the contents of the organs in the inherited automatic movements. In walking, for instance, the afferent impulses resulting from the movement of one limb stimulates the centre for moving the other limb, and so on, the individual being only slightly conscious of the movements.

Imitative movements are intermediate between the two types, and also between the voluntary and the non-voluntary. Though they are often indications of mental states more complex than simple sensations, yet they are made by babes so young as not to have any very complex mental states, and by children and adults with so little consciousness that they may, in their earliest appearance at any rate, be classed as belonging to the reflex and also to the non-voluntary motions. Of course imitative movements may be made voluntarily, but often they are not made as perfectly as when made almost unconsciously. Imitative movements belong

to the same order of facts as those cited in showing that a mental image of a movement produces the movement, though what calls forth the movement is a precept of it. It is therefore not strange that a movement observed intently by a child is made more perfectly even when unintentional than any made by voluntary attention to a mental image. All kinds of movements are therefore most naturally and easily learned by imitation.

Development of Voluntary Motion.—Voluntary motion, which is distinguished as being consciously purposeful, is possible only after the making of many non-voluntary motions. The child cannot know how to make a motion to attain a purpose until he has made it once—any more than a man who had never seen an organ would know what key to strike in order to sound a note that he had just heard. It is not altogether a matter of chance, however, with the child as with the one who would play on the piano. There seems to be some kind of a natural relation between the auditory centre of the child's brain and the motor centre for speech, so that when he hears a sound an impulse passes from the former to the latter, and he makes a sound just heard with little or no effort or practice. Also, there seems to be some natural relation between the visual centre and the motor centre for the limbs, so that when a bright object is put before a child and he tries to get it, he makes a motion that is at least toward the object, though perhaps not at all accurate. After a few trials he makes it just right, and soon learns to make it accurately at will. If it were from the first *entirely* a

matter of choice, he would be just as likely to move a toe as a finger and away from instead of toward the object, and it might be years before he would happen upon the right motion. No doubt impulsive and expressive movements that happen to result in the attainment of desired ends are important factors in developing voluntary motion, as well as this natural relation between the centres for the various sensations and the various movements. The most important factor is, however, the imitation of movements made by others. The observation of a motion made by another naturally excites a similar motion on the part of the child observing it. The motion made thus can then soon be made voluntarily—just as soon as he can voluntarily hold a mental image of it in mind. On the psychological side the child learns what movements are necessary to attain various desired ends, and is able to form more and more perfect mental images of the various motions. On the physiological side the natural connections between the visual and auditory centres are made more complete and definite, and many new ones probably found, and more definite “paths” formed for the nervous impulses passing from the brain to the lower centres and to the muscles. Voluntary movements begin in attempts to attain desired ends by movement, next clear mental images of the movements made in attaining these ends are formed and power of controlling them gained; then, after they have been made many times, the images of movement become less vivid, and finally are scarcely noticed, the thought of the end being sufficient to call

forth the movements. This is the natural course of development. In education there has probably always been an over emphasis upon the second stage. Report any facts you have observed on development of voluntary motions.

CHAPTER III.

ACTIONS.

Action Distinguished from Movement.—Is it possible to make the same movement and yet perform an entirely different action (e.g., firing a gun at a dog and at a man)? Illustrate further: When we speak of a movement do we necessarily have any reference to the end or purpose of the movement? Do we usually when we speak of an action? The two terms are often used interchangeably, but the word *movement* refers only to the physical phenomenon, while the word *action* may, and frequently does, include also the psychical phenomenon of which the movement is an indication. Action has a mental and moral significance that does not attach to movement. Movement affects the bodily development, action has a very important influence upon the moral development. Movements are a means to an end, while actions include both the movement and the purpose of the movement, the feelings and ideas accompanying and prompting it.

Ideas as Stimuli to Action.—We have found that sensations or images of a movement, or those associated with a movement, tend to produce the movement; and now the question comes as to whether the same is true

of actions. From the fact that movement is a part of an action, and also that moments tend to excite feelings in accordance with themselves, it might be inferred *à priori* that the idea of an action would tend to produce the action. Let us see whether experience supports this view. Do you find in yourself or have you observed in others a tendency to do as others do, or as some one you have read about did? Is this because the action is approved or because the idea prominent in the mind tends to go out in action? Sometimes when children are told very emphatically not to go into a certain room or open a certain drawer they do it the first opportunity. Mention similar instances you have observed. Is such action because children are naturally contrary or because ideas of action naturally produce the action? A sentry in Napoleon's army committed suicide in his box. A little later another sentry committed suicide in that box, and soon afterward a third. Napoleon then ordered the box burned down, and no more suicides occurred. A sentry alone in that box would be likely to dwell on the action of the other man and imagine all the details until the idea produced its natural result—action.

Many people when on a high building feel an impulse to throw themselves off, probably because looking down suggests very strongly the idea of moving down, and that tends to produce the action. Give other illustrations from your own experience, observation, and reading of ideas of action tending to go out in action. Does it seem correct, then, to say that an idea of an action naturally produces the action, and will do so unless other ideas or an act of the will prevents it?

Impulsive Force of Ideas.—Many ideas that are not of actions are in some way associated with actions, and when held in mind impel to action. Some ideas have much greater impulsive force than others: thus, the idea of a comfortable seat may impel a man to move across the room, while the idea of danger may impel him to run for miles. Give other illustrations. Ideas do not have the same impulsive force for all persons: thus, the idea of seeing a new species of animal may impel one person to walk across the street and another to go a day's journey, or the idea of solving a problem may induce one to work at it a half hour and another to spend days in its solution. Give other illustrations. The closeness of association between any idea and a corresponding action and the degree of impulsive force it has varies with the following factors: instincts, inherited tendencies, feelings, habits, and ideals. Sometimes the impulsive force of an idea is due almost wholly to one or two of these factors, at other times to all.

All ideas connected with the preservation and enjoyment of life, as food, clothing, shelter, power, reputation, have great impulsive force, due largely to instinct. Do they all have great impulsive force to all men? A number of men who tried to hold their fingers against a pane of glass while a rattlesnake struck at it from the other side were unable to do so. Why? Give other illustrations of the impulsive force of instincts and of the tendency of such ideas to dominate consciousness. May we say that all ideas that have great impulsive force for *all men* are probably instinctive?

Edwards, the Scotch naturalist, from earliest childhood would go almost any distance and suffer any hardship or punishment if he could thus satisfy his impulse to be with and find out about living creatures. Audubon from the earliest years was stimulated more by ideas associated with birds than almost any other ideas, even those of food and clothing. Give other illustrations of ideas that have great impulsive force by inheritance.

Illustrate the fact that ideas of pain or pleasure to be experienced or avoided tend to produce vigorous action. Does the nearness or remoteness of the pain or pleasure to be experienced make any difference as to the impulsive force of the idea? Illustrate. Is the difference any greater with children than with older people? with savages than with civilized? Illustrate.

What is it that makes a man work hard to gain additional wealth when he has much more than he can ever use or enjoy in any way? What is it that makes a man continue to drink though he knows that he could live longer and happier without it? Give illustrations from your own experience and observation of habit determining the actions of men.

One's ideal of what should be done is often an important factor in influencing action. This ideal may be general and more or less indefinite, or it may be embodied in a maxim, a proverb, a rule, a principle, or, a person may be taken as a model. Give several instances of actions by yourself that were influenced by ideals in one of the above forms. State what ones of these five factors influence your actions the most.

Instincts, inherited tendencies, and habits are doubtless all powerful influences in determining one's actions; but is it not true that they are largely unconscious influences, and more evident to others than to the individual acting? Feelings and ideals, however, are distinctly conscious factors influencing action, sometimes both impelling to the same action, sometimes to entirely different actions. The first three factors probably influence the feelings and the ideals, do they not? Do not the feelings also tend to modify the ideals and the ideals the feelings? So, finally, would not all of these factors tend to act in the same direction, the result being more consistent and vigorous action?

Feeling is, of course, always involved in the ideal, for an *ideal* means an idea plus a feeling of approval of that idea and a desire that it shall be realized. This appreciation of what is right and proper may be and often is, however, opposed to the more immediate and sensory or instinctive feelings; hence when these two kinds of feelings are opposed to each other it is only after much action in accordance with the ideal feelings that the ideal becomes the all-powerful factor in determining action.

Attention and Action.—From previous discussion it appears that the actions are determined by ideas of the actions or ideas associated with them; hence we might infer that the ideas that dominate consciousness, i.e., that are attended to, will determine what the actions shall be. Is it not true that the five factors that determine the impulsive force of ideas also determine in a large measure what ideas shall be attended to and domi-

nate consciousness? An action results whenever the ideas associated with it are powerful enough to dominate consciousness a sufficient length of time. Thus if an agent can suggest and keep before the mind of a person the idea of buying he usually makes a sale, and much of his art is usually exercised in keeping the mind of the desired customer upon ideas associated with purchasing, such as the kind of article he would prefer, and when he would want it how he would use it. All men, whether agents, lawyers, ministers, politicians, or teachers, who are successful in influencing the actions of others consciously or unconsciously do so by directing their attention to ideas associated with the action they wish them to perform. Give specific illustrations from your own experience, observation, or reading. If one can by any means succeed in keeping the attention of another upon certain ideas for a sufficient length of time, the action associated with those ideas will be likely to result. The actions of the hypnotic subject are completely controlled by the operator, because the will of the subject is not active to direct his attention, and it is directed wholly by the operator, hence the actions of the subject are in accordance with the ideas suggested by the operator.

Deliberation and Inhibition.—If action always resulted immediately from attention to ideas associated with the action there would be little chance for wise action. Many ideas, however, are usually claiming the attention at the same time, and prevent the complete dominance of one, and immediate action in accordance with it. We have also learned by experience that actions

often have unpleasant results; hence we usually voluntarily inhibit the action we have a tendency to perform until ideas of the results can arise and we have deliberated upon them for a time that may vary from seconds to years. This power to inhibit and tendency to deliberate varies greatly in different individuals. Perhaps no more striking instance of the power could be given than that exhibited by an officer of whom this incident is related: Upon placing his hand upon the ground beside him he felt something cold, and looking down saw that his hand was upon the neck of a poisonous serpent. Instead of jerking away his hand as he had a natural tendency to do, though doing so would have released the serpent and given it an opportunity to strike him, he kept his hand upon it, drew a knife with the other hand from his pocket, opened it with his teeth, and then cut off the reptile's head. Few have such power of inhibition and deliberation as this, but all have the power to some extent and use it in a greater or less degree. Recall several instances in which you have exercised this power, indicating the idea that helped to inhibit the action.

Many disadvantages result from failing to use this power. Recall instances of bodily injury, such as indigestion or a cold, that you have observed result from failing to deliberate or "think." Recall also instances of social mistakes due to the same cause, and also of wrong acts. Is not deliberation an important element in tact and prudence? (Good judgment is probably the other most important element.) People in making inferences often make absurd errors because they "jump

at conclusions," or, in other words, do not deliberate long enough for all ideas bearing on the question to come into the mind. Illustrate this. Mention also instances of financial loss resulting from failure to deliberate before acting.

Deliberation is always an advantage if it is not continued too long, so that the opportunity for action is gone or the impulses to action are weakened, and little or no vigorous action is performed. Mention persons of this kind that you have known or read of in history or literature (e.g., the character of Langham in *Robert Elsmere*).

Basis of Individual Differences in Activity.—We have already pointed out individual differences in the impelling force of ideas and also in the power of inhibition. A moment's thought shows that if inhibition were continually greater than the impulsive force of ideas, or if the impulsive force of opposing ideas remained equal, there would be no action. On the other hand, were there no inhibition and no deliberation sufficient for conflicting ideas to arise before action, there would be continual activity with but little consistency in it, every idea producing its appropriate action. Is it not evident, then, that the amount of activity of any individual depends upon the relation between the impulsive force of his ideas and his tendency to deliberate and his power of inhibition? Suppose a person is very active in general or in certain ways, does it follow, then, that ideas have for him any more impulsive force than for the average man, or may it be the result of lack of power or tendency to inhibit his activity? If one drinks or talks

excessively, or fights or steals, does it follow that his desire to do those things or the impelling force of those ideas is any stronger in him than in other people, or may they be explained by supposing that they are a little stronger than his tendency to do the opposite, yet no stronger than that of the average person, but that the power of inhibition is unusually weak? Give any examples that have come within your observation or reading.

When a person is very inactive either in general or in special directions, is it always because ideas have not for him the usual impulsive force, or may it be because he has more than the usual tendency to deliberation and inhibition, so that the tendency to the action is neutralized? Illustrate and give reasons.

Which of the following four conditions do you think most favorable to vigorous and well-directed activity: (1) weak impulse and little inhibitory power; (2) strong impulse and little inhibitory power; (3) weak impulse and strong inhibitory power; (4) strong impulse and great power of inhibition? Why? Which would you rather attempt to train—a child who shows a very strong tendency to activities of all kinds both good and bad, or one who showed little tendency to activity in any direction? Why?

Types of Decision.—In deliberating upon alternative actions, ideas associated with one of those actions become dominant and are accepted as the ones to be realized, and thus a decision is made. The manner of making a decision varies greatly, but the following modes of deciding suggested by Prof. James are typical. Perhaps

nearly every person has at some time decided in all these ways, but many habitually decide in accordance with one of the types.

Do you ever, when a course of action is proposed, think the matter over, the reasons for and against, then decide without any particular effort in accordance with the weight of evidence either for or against? Illustrate. This may be called the *reasonable type* of decision, for reason decides.

Again, do you ever consider the action and the reasons for or against, but find them balancing pretty equally. In such cases do you ever in a way let yourself drift till something happens in external circumstances that either decides the matter for you or enables you to decide easily? Illustrate. This may be called *circumstantial decision*.

Do you ever deliberate until you get tired or impatient and decide on the impulse of the moment rather than in accordance with the reasons or in accordance with the suggestion of external circumstances? Illustrate. This may be called *impulsive decision*.

When the decision involves a conflict between ideas of actions both of which are desirable but only one of which is possible, there is often considerable feeling accompanying the deliberation and the decision. In such cases the reasons do not decide the matter, and perhaps we feel the matter is too important to leave to circumstances to decide for us, or there is no probability of their doing it, and no internal impulse sufficiently strong comes to decide the matter. Finally, we give up one of the desirable ends and decide to act for the attainment of the other,

perhaps feeling all the time that we are losing something very desirable, and deciding only with an effort; hence this may be called an *effortful decision*. Have you ever experienced such a decision? Give illustrations from your observation or reading of decisions of each of these four types.

Desire, Decision, Resolution, Action.—Do you ever desire a thing without trying to get it? In order to desire a thing is it necessary to know a means of attaining it? Are desires likely to develop into actions when means of attainment are presented? Illustrate. Is the continued harboring of desires good or bad likely to result in corresponding actions? Could one be legally punished for desiring the death of a man or the desire to steal a horse? Could he if he not only desired but decided to kill the man or steal the horse, yet did nothing? Could one be punished for killing a man in an entirely accidental way without desiring to do so? or must one desire, decide, and act before he is guilty in the sight of the law? If the desire is momentary, as in anger, and not previously cherished, the guilt is not considered so great; but if the desire has been cherished, and an attempt made to carry it out there is guilt whether the act is successful or not.

Did you ever decide to do a thing, but not perform the act for days or months? The choosing to do that thing rather than any other was a decision. If that decision is kept in mind and reaffirmed, what would you call it? Is it necessary for the means to be clearly represented in order to resolve, or may the means of attaining the end be but vaguely known? Which is most

typical of a man and hence most worthy of punishment or reward, as the case may be—action performed as the result of a hasty decision, or one that is performed as the result of a resolution long held in mind? Why?

Actions and Rules or Commands.—It is held that, theoretically, there is a choice and decision in every action—at least as to doing or not doing; but practically there is often no thought of any other action, or of not acting. In obeying commands or in following rules that we expect will lead us to ends previously chosen there is little or no choice, but the mind is occupied only with ideas of the means of conforming to the rule or command. Verify this in following directions given in physical exercises, marching, performing a new kind of manual work, conforming to the rules in arithmetic, or in a game. Notice also in the above and in the following instances to what extent inhibition is used in conforming to rules: the child upon entering school must not do as he feels like doing, but as told; the young person entering society must act in accordance with the rules of etiquette, and the young business man with business customs.

Strength of Will.—We have already found that the function of will is to direct activities toward represented ends, and that will is efficient just in proportion as it directs *all* activities toward the end represented, and as it is able to do this for many ends. Would you not say that a strong will must have these characteristics of an efficient will? Is great impulsive force of ideas and power of inhibition necessary to great strength of will? Is there anything else involved in your idea of a strong

will? Suppose the activity is directed toward the represented end only a short time, then ceases or is directed toward another represented end, would you say that the person possessed a strong will? Is constancy, then, a necessary element? Give three examples of what you would call an exhibition of a strong will from your own observation or reading, then state in a sentence or two the characteristics of a strong will. In accordance with your definition of a strong will, could one show a strong will in doing evil as well as in doing good?

We have found that the most conscious and the most variable factors affecting one's choice of ends are feelings and ideals, and as adherence to a decision once made is necessary to strength of will, the question arises as to whether a strong will is influenced most by feelings or by ideals. Which will be most likely to be adhered to—a decision influenced mainly by a feeling or one influenced mainly by an ideal of what is right, proper, or advantageous? Would you say that a strong will cannot be one that is influenced mainly by feelings in opposition to ideals, or only that it is not likely to be? Thus, if the desire for drinking or gambling remains constant and determines all the action, would you say that the individual has a strong will, though of an evil kind? If an individual has no very definite ideal of what one ought to do or a wrong ideal, yet has feelings that continually impel him to act so as to make other people happy or so as to attain great skill in a certain direction (e.g., skill as a mechanic), would you say that he has a strong will, though of an unusual type? Or would you say that not only is a strong will one that is usually directed by a definite

ideal, but that it cannot be a strong will unless it is? Compare your opinions with your first statement of what a strong will is, and see if you need to modify it.

What is the difference between a stubborn or obstinate man and a strong-willed man? Name the characteristics that seem to you common in the two and those that are special to each. Will a stubborn man change his course of action when convinced it is wrong? Will the strong-willed man? After making a decision will a strong-willed man ever change it because of a change in feeling? Will he change it unless circumstances change or some new consideration is brought to his mind that he had not thought of when he first decided? Can a man have a strong will who does not deliberate and take into consideration everything bearing on the case known to him before making a decision? Why? Which will be most likely to have a strong will—one in whom by inheritance or through habit the five factors influencing action all impel in the same direction, or one in whom they impel to opposing actions? If one has not acted in accordance with one ideal all the time, will not every act opposed to the ideal decrease his power to act in accord with the other?

Sum up now in definite statements the conclusions you have reached as to what constitutes strength of will and the conditions necessary to its existence.

Freedom of the Will.—We will first consider freedom in the sense of partial or complete independence of external influences. In the very nature of the case is it possible for a volitional act on the part of an individual to be produced wholly by some external force? Could

we not say that if the act is produced wholly from without, that not only is there no free will, but no will? However, will may be influenced from without by exciting ideas and feelings that lead to action. Which has the freest will—one who acts almost wholly in accordance with these influences, or the one who acts in accordance with his ideals, whatever the external influences may be? If a boy out with companions or in new surroundings continues to act in accordance with what he thinks right and proper, regardless of external influences, would you say he possesses great freedom of will as well as strength of will? Should you consider that good training which produces such a result? Is it not one of the main purposes of will training to make the person independent of all influences not in accordance with his ideals, or, in other words, to make ideals stronger than external influences?

There is a freedom of the will which may be known as *practical freedom*. It is freedom to attain represented ends. This means not only independence of external influences, but also independence of internal impulses to act in ways not in accord with represented ends. If one's feelings, inherited tendencies, or habits prevent him from acting in accordance with his ideals, from attaining the ends he sets before him, is he, in your judgment, any more free than the one who is prevented from attaining represented ends by external influences?

In order to attain one's ends not only must one be independent of external influences and internal impulses, but he must know how to use external things to attain his ends. Verify this by reference to the actions of car-

penters, artists, farmers, and politicians. Furthermore, he must know how to direct his own activities to the represented end, and have the power of control that will enable him to so direct them. If a boy wishes to be able to draw as perfect a picture as his teacher, he must know how to work and gain the power to control his motions. If he wishes to be able to solve any problem in the arithmetic he must know how to do it, and gain the power to direct his intellectual powers to the task. Illustrate further the fact that practical freedom requires a knowledge of means of attaining desirable ends and power to direct one's activities in the use of those means. Indicate the difference between educated and uneducated and civilized and savage, as to the practical freedom of will they possess.

Notice also how the farmer, in attaining the end of raising good corn, learns to know and make use of the means by which good corn can be raised. This means that he must know the laws according to which plants grow, and particularly those governing the growth of corn, and that he attains the desired end, good corn, only by conforming to those laws. If he attempts to obtain good corn in any other way he fails. In other words, he is free to obtain the desired end only so far as he obeys the laws of nature by which that end is obtained. A mechanic also can succeed in making a machine that will run only by conforming to the laws of mechanics in constructing it. Give other illustrations of the truth that in order to attain any end one must use certain means in accordance with certain laws. This leads us to the seeming paradoxical statement, but really very profound

truth, that freedom is possible only in conformity to law. The civilized nations are freer to obtain many desired ends than the savage, because they know more of the laws of nature and have the power to act in accord with them. That individual, then, has the greatest practical freedom who most perfectly directs his activities in accord with the laws by which the desired ends are to be obtained.

There are many ends desired by every one, but not all can be obtained. The choice of one end often means that several others are rendered impossible. Thus the choosing and obtaining of certain bodily pleasures often mean loss of the pleasure of health and of the power to attain many other desired ends; the gratification of certain selfish feelings often means the loss of the sympathy and regard of others that are desired. It follows, then, that one may in choosing and obtaining certain ends render impossible the attainment of a great many other desired ends, and so his freedom is very much limited in that he can obtain but few of the many desirable ends. The one who can so choose his ends and direct his activities that he shall obtain the greatest number of desired ends has the greatest practical freedom. There are certain ends which, when striven for in the right way, do not render impossible other desired ends, but, on the contrary, help in the attainment of a large number of other ends. Those who choose such ends and means of attainment possess the greatest practical freedom. Those who best know the laws of nature and of their own nature, and most perfectly choose ends and direct activities in accordance with those laws, are the ones who pos-

sess the greatest freedom. If this is true, does it not follow that a bad person cannot be free in any considerable degree?—for evil action is evil because it interferes with the attainment of valuable ends through want of conformity to the laws of nature.

Does it not also follow that only he whose actions have been consistent can have a strong free will, since every act in accord with certain ideals increases the power and tendency to act in accordance with those ideals, while opposite action decreases the power and tendency to act toward the attainment of such ideals? One may therefore lack all power of acting toward the attainment of ideal ends, because all the actions of his past life have been of the opposite kind, and the result is that they all detract from his power to act as he would. On the other hand, one who has always acted consistently will have his power to act increased by every act that he has previously performed.

Relation of Intellect, Feeling, and Will.—It is evident from the preceding discussion that the intellect is used in finding out the various ends that may be chosen, in deciding which is best, in clearly representing the end, in finding out, choosing, and using the best means of attaining the chosen ends; hence the will could not act without intellect, and the effectiveness of the will activity is determined by the kind and amount of intellectual activity. It is also evident that feelings are the great stimuli to action, ideals becoming without them mere ideas without impelling force: so the disappearance of feeling would mean the cessation of will activity. Intellect and feeling might exist in some degree without will,

but the intellectual activities excited by the various stimuli would not be directed to the attainment of any definite ends, and the feelings of desire excited by the various intellectual activities would remain unsatisfied. Ideas have no value in themselves, but only as they show to us objects of desire and means of obtaining them. Desires and feelings have no value, only as they stimulate to action that will attain the end of the desires; hence the important thing is not intellect alone, nor feeling alone, but intellect, feeling, and will united and fused in action. The natural result of all intellectual activity and all feeling is action, and any marked tendency to isolate one of the three powers of the mind from the others must be considered as abnormal. Perfect balance and union of these three forms of mental activity is the ideal condition, and any training that tends to isolate them, or develop one in excess of the other, is to be condemned. Cold intellectuality, sickly sentimentality, or unwise or useless action are the natural results of isolation and over-development of one or the other of these powers. Not what a man thinks during purposeless mental activity, not what a man feels, but what a man does, and the wisdom, goodness, and usefulness of his actions as the result of his thinking and feeling, are the important things to the world, and to the man in determining what he is and shall be. A man should not be merely a thinker, even though a purposeful one, nor merely a sentimentalist, though his feelings are of the highest, nor merely a doer, though his activity be ever so great, but one who thinks, feels, and acts, whose thoughts and feelings go out in action. The

action should not be too quick, lest the thinking be not finished and the action unwise; nor too slow, lest the impulse die and nothing be done.

The natural relation between intellect, feeling, and will has perhaps been most ignored in education, which has not only made scholars and thinkers rather than workers, but has not even produced the highest intellectual development, because the natural relations existing between the three mental powers have not been sufficiently recognized. The intellectual efforts have lacked vigor and useful direction, because the feelings that should accompany them have not been aroused to serve as a stimulus, and because little opportunity has been given for the expression of the thoughts and feelings in action. Every object of knowledge should and, if suited to the mental condition of the person at the time, does excite a feeling of interest of some kind. This feeling of interest produces a desire for further knowledge, and knowledge gained and appreciated naturally expresses itself. The kindergarten is the only place where this fundamental truth is fully recognized, and every thought and feeling is provided a means of expression in action.

Conditions Favoring Vigorous Volition.—In observing children and others we are often puzzled by the fact that in doing some things they show great energy and persistency, while in others they work fitfully, languidly, or not at all. In one instance they seem to have great will-power and in the other little or none. Mention some instances of this kind that you have noticed either in the activity of work or play of particular kinds. Now let us analyze and see what con-

ditions of mind are necessary to vigorous activity in any particular direction, even when the individual is known to possess energy and will-power.

In the first place we have already found that in all volitional activity the end to be gained must be represented in the mind of the person who is active. But in order that the activity be vigorous, there must also be a feeling of the value of the end to serve as an impelling force. Again, the end represented can be gained only through the use of the necessary means, and the individual must know these means and believe that they will be effective in reaching the end. All these mental conditions, however, may be present in an individual possessing plenty of energy, and yet he may say "I can't," and either not try or try in a half-hearted way, simply because he does not believe that *he* can use those means so as to reach the desired end. In order to act vigorously he must have confidence in his ability to direct his activity in the use of those means so as to reach the desired end. The individual's past experience as well as his natural disposition will have much to do with this latter condition. If he has frequently failed, especially in similar attempts, confidence will be lacking; but if he has usually been successful, particularly in activity similar to that now engaged in, he will have all the confidence necessary for vigorous effort. Indicate how the work of the school may be arranged so as to inspire children with such confidence.

The first-named conditions of vigorous volition are not so much dependent upon the past as upon the present. The end may be clearly set before the person so that he

will clearly perceive it and appreciate its value, and the means of attaining it may be clearly pointed out and shown to be practicable. Indicate some use and some violation of these principles in assigning lessons. May not their use in school be a means of increasing intellectual attainments and also of developing will-power?

Development of Will.—Every observer of young children knows that children are knowing and feeling creatures before they are willing persons. They are active before they control their activities. Every activity is performed non-voluntarily before it is performed voluntarily. They learn by experience the results of their activities, and learn to control and direct those activities. Through the intellect the child learns to know the ends and the means of attaining the ends, while the feelings aroused by the idea of the ends impel him to activity; hence his will activity is called forth by the ideas received and the feelings aroused.

In the will activity thus called forth two things are involved—choice of ends and the direction of activities to the attainment of ends. It is usually thought that children are not sufficiently intelligent to do the first, so will-training is usually begun by training them to direct their activities toward the attainment of ends chosen by older persons—parents or teachers. If the ends are wisely chosen and consistently adhered to, and the activities well directed, the training given is unquestionably a valuable one. To be able to control the thoughts, feelings, and movements is a necessary condition of a strong, free will, and there is no doubt that conformity to commands, rules, and laws given by parents, teachers,

and society develops power in this direction. It is equally evident, however, that no amount of such conformity could ever produce perfect and complete development of will, for the power to choose ends and means of attaining them is not developed. If training in obedience to rules were given continually and no other, the result would be a human machine suited to act perfectly in definite ways under certain fixed conditions, but incapable of acting wisely under new conditions.

On the other hand, if a child is left entirely without direction or help and required to obey no rule his choices may be very unwise ones, or he may fail to develop any power of control, though, if the surroundings are good, neither of these results are likely to follow, for imitation of others and experience of the results of actions will give him a good education in both choosing and controlling actions. In most cases, however, assistance may be rendered in the development of a free, strong will by a wise educator.

It is evident, however, that if the will is to be trained by parent or teacher that there must be training in choosing as well as in acting in accordance with rules or commands. In its truest sense will activity is from within—the result of feelings, desires, and inherent tendencies, and a strong, free will can only be developed by strengthening and harmonizing these interior springs of action; hence rules and commands should not (in the ideal method of will training) be imposed from without in opposition to the feelings of the individual, but instead feelings and ideas aroused that will lead to choice and vigorous action in accordance with the rule or

command, which may be given as a suggestion. In cases where the child is likely, through want of comprehension of the results, to choose actions that are very hurtful, the educator is justified in choosing for him. In all other cases children should be permitted to choose for themselves, being helped, however, by the ideas presented by parent or teacher and the feelings aroused by attention to those ideas. Since a child can know of the results of action and how to control activities only by experience, he should be allowed to learn in that way, even though he makes many mistakes in choosing ends and means of attainment. Lessons thus learned form the basis of all will training. No other need be given, except where the results are very remote and hard to see or very dangerous. In these instances the child should be and will be ready to choose what the parent or teacher says is best if in all its previous experience it has found that what they said about the results of action has been true. If the child has had no such experience it has no basis for making an intelligent choice, and very naturally does not obey the command or rule unless made to do so by punishment. Punishment often produces a dislike for that rule, and perhaps for all rules; and the child instead of learning that rules are guides that help him in attaining desired ends, looks upon them as hindrances arbitrarily placed in the way of the attainment of his desires, and so he makes it his aim to disobey them as much as possible.

The best will training, then, is that which presents to the child ideas suggesting right and wise action, and directs his attention to the results of action in such a

way as to lead to more wise choices and more effective direction of activities, and to a more and more perfect consciousness of the fact that there is freedom only in conformity to law. As essentials to a strong free will, the effort should be to build up in the mind of the child right ideals and to develop the power and habit of directing his activities in accordance with those ideals.

These ideals are formed not so much by being told what is right and best, as by the ideas and feelings suggested and aroused by what is told and the manner in which it is told. The most important factors in forming the ideals are the actions of the person the child comes in contact with, and that he hears and reads about. They are the models which he both unconsciously and consciously imitates, and the more he imitates them the more fully do they become his ideals of action, for he has the idea of the action more perfectly, and habit tends to make the idea pleasant, and thus it becomes his ideal and determines his action.

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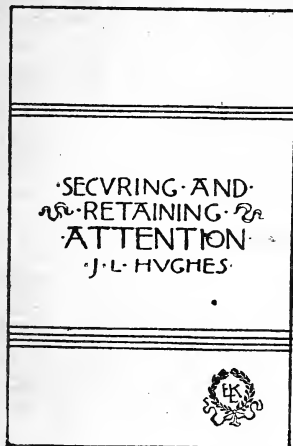
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